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ABSTRACT

The 1995-96 evaluation of tech prep in Washington consisted of the following activities: an analysis of survey data collected from all 22 tech prep consortia in the state, case studies of 7 tech prep consortia, and an analysis of student survey data collected from more than 2,000 students in 4 high schools in the 7 consortia. The study found that tech prep has grown from 170 student participants in 1992-93 to 11,889 in 1994-95. In many cases, tech prep has provided an excellent foundation for school-to-work transition and other educational reform efforts. It has made a case for workplace learning for college-bound as well as noncollege-bound students. It was recommended that the tech prep initiative should provide more communications about tech prep to students, parents, educators, and the business community, and that future follow-up studies of tech prep completers be conducted. (The report includes the seven case studies and student survey results.) (KC)

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The Northwest Regional Educational Laboratory

RESEARCH REPORT

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A THIRD-YEAR ASSESSMENT OF TECH PREP IN WASHINGTON STATE

August 1996

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A THIRD-YEAR ASSESSMENT OF TECH PREP IN WASHINGTON STATE

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August 1996

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For the case study section of this report we wish to thank especially, Ray Harry, Washington state Tech Prep program coordinator at the State Board for Community and Technical Colleges, for reviewing the draft questions to be asked and to the Tech Prep consortium director at each case study site. Listed below is the name of each consortia visited, the Tech Prep Consortium director, and the NWREL staff member who conducted that visit.

CONSORTIUM	DIRECTOR	NWREL STAFF PERSON
Northeast Tech Prep	Susan Quattrociocchi	Larry McClure
Seattle Tech Prep	Marie Coon/Leroy Drake	Tom Owens
South King Co. Tech Prep	Chris Stone-Ewing	Tom Owens
Columbia Basin Tech Prep	Molly Sullivan	Changhua Wang
Northeast Washington Technical Education Consortium (Spokane)	Verlee Sutherlin	Francie Lindner
Twin County Tech Prep	Scott Phillipi	Changhua Wang
Yakima Valley Tech Prep	Nick Parisi	Francie Lindner

For the student survey section of this report we express appreciation to the following people who helped with the review of the draft instrument: Marie Coon, previous chair of the Washington Tech Prep Directors Association; Ray Harry, Washington state Tech Prep program director at the State Board for Community and Technical Colleges; Carilyn Norris, Office of the Superintendent of Public Instruction; David Pavelchek, Workforce Training and Education Coordinating Board; and Chris Stone-Ewing, South King Co. Tech Prep. We also thank the principal and staff at each of the four participating high schools—Gloria Izard-Baldwin at Ingraham, Ed Marcoe at Issaquah, Leroy Werkhoven at Wapato, and Bob Miller at Hoquiam.

EXECUTIVE SUMMARY

Introduction

This 1995-96 evaluation of Tech Prep in Washington was conducted by the Northwest Regional Educational Laboratory staff under contract with the State Board for Community and Technical Colleges. The evaluation consisted of three components: (1) an analysis of survey data collected from all 22 Tech Prep consortia in Washington state by Mathematica Policy Research, Inc. as part of its five-year national evaluation of Tech Prep, (2) case studies of seven Tech Prep consortia, and (3) an analysis of student survey data collected from four high schools in the seven consortia studied. This executive summary is organized around these three components, followed by some conclusions and recommendations.

Implementation Survey

The Tech Prep implementation survey, conducted by Mathematica Policy Research, Inc. in the fall of 1993, 1994, and 1995, was completed nationwide by more than 1,000 local Tech Prep consortium directors. In Washington it was completed by 15 local Tech Prep consortium directors in 1993, and by all 22 directors in 1994 and 1995. Thus this analysis allows us to see some changes that have occurred in Tech Prep over the past three years.

The survey was designed to describe Tech Prep planning and implementation processes involving Tech Prep; consortium governance and staff; funding and resources; the Tech Prep program and population; choices for secondary Tech Prep students; secondary and postsecondary curriculum development and articulation; counseling, guidance, and career development; staff development and promotion of Tech Prep student outcomes; and monitoring and evaluation of Tech Prep progress. In 1995 some questions were added that involved the relationship of Tech Prep to school-to-work transition.

Listed below are the major findings from our analysis of the implementation survey:

- The number of students in Tech Prep has grown dramatically over the past three years. Only one of the 15 consortia in Washington enrolled Tech Prep students in the 1992-93 school year, while in 1994 10 of the 22 consortia reported having Tech Prep students and 11 did so in 1995. There were 170 secondary Tech Prep students enrolled in grades nine to 12 in 1993, 2,203 in 1994, and 11,889 in 1995. Students were mainly enrolled in the business/office/marketing areas.

- Perceptions of core elements required for Tech Prep vary widely from one consortium to the next. Nineteen of the 22 consortia reported on the core elements of their Tech Prep programs this school year. Seventeen required Tech Prep students to complete a student education plan, 16 required students to take vocational/technical courses, 11 required students to elect to be in Tech Prep, and seven required students to take one or more applied academics courses. These numbers show a decline from the previous year as the definition of Tech Prep has become more generic across the state.

- All consortia had signed articulation agreements. Articulation agreements are formal, signed arrangements between secondary schools and community colleges designed to enable a community college to accept for credit certain high school courses that are part of a Tech Prep sequence. The most common feature of these agreements allows students who complete approved secondary courses to skip prerequisite or introductory courses at the postsecondary level. Eight or more of the consortia had articulation agreements in business/office/marketing, in engineering/technology, and in mechanical/industrial/trade. Two had an articulation agreement in agriculture, three had agreements in health/human services.

- Applied academics courses are being implemented more widely this past year in Washington. The most frequently used commercial curriculum is Applied Mathematics (in 140 high schools), followed by Applied Communication (111) and Principles of Technology (91).

- Graduates of Tech Prep programs are pursuing education in both two- and four- year institutions. The consortia reported data on 197 Tech Prep graduates who have pursued training beyond high school. There are 152 who were reported to have enrolled in community college and 27 in a four-year college. There may have actually been more than 27 who entered a four-year college but this information was not available to the consortium directors.

- An increasing number of businesses and labor groups are working with educators in Tech Prep. The Tech Prep survey reports that 292 secondary schools, 56 postsecondary institutions, 168 businesses, and 40 labor groups were involved in Tech Prep planning or implementation in Washington. Two-thirds or more of the consortia reported that businesses provided facility tours or other career awareness events, and helped develop curricula, define desired outcomes, and support staff development. Half of the consortia reported business help in youth apprenticeship and/or worksite learning slots, and in providing speakers and/or classroom instructors this year.

- Lack of staff, time, and money dedicated to Tech Prep and lack of truly integrated curriculum were the most commonly perceived limitations of the program. The most successful aspects were collaboration between secondary and postsecondary educators and between vocational and academic educators; development of administrative support; development of increased awareness of Tech Prep among educators and the public; involvement of business, industry, and labor, and development of articulation agreements.

- Since 1994, the consortia have spent a smaller percentage of their funds on general administration and a larger percentage on staff development and curriculum development. This reflects a more concrete effort to sustain the impact of Tech Prep.

Case Studies

As part of the overall evaluation of the Tech Prep programs in Washington state, Northwest Regional Educational Laboratory (NWREL) staff conducted case studies of seven local Tech Prep consortia. These in-depth studies are intended to identify and document in some detail for the seven consortia an overview of the community and consortium, changes over the past year, promising practices noted, relation to school-to-work transition, impact on participating students, and perceived strengths and concerns.

The sites selected for study were the Northeast Tech Prep Consortium, Seattle Tech Prep Consortium, Twin County Tech Prep Consortium (Grays Harbor and Pacific counties), Columbia Basin Tech Prep Consortium, South King County Tech Prep, Northeast Washington Technical Education Consortium (Spokane), and Yakima Valley Tech Prep Consortium. The first four represent consortia that were also studied by NWREL the previous year while the last three were added for 1996. They reflect diversity in geographic location, setting (urban and rural), student composition, and consortium size. Findings from these case studies are summarized below. Each site is presented in greater detail in the Case Studies section of the report.

Changes and Accomplishments Over the Last Year

Over the last year, Tech Prep students have begun entering community colleges, more Tech Prep materials have been produced, more articulation agreements have been completed, and more students are involved in career pathways and work-based learning.

Consortia are trying out new ways of communicating about Tech Prep and strengthening links between the secondary and postsecondary level. For instance, in one consortium advisors from the community college go to the high schools to talk about the college, Tech Prep, and articulation agreements. In another consortium, high school staff attend a workshop at the community colleges. A third has a "roving ambassador" who goes from school to school, talking to students and counselors about Tech Prep.

Promising Practices

Some promising practices from the consortia may be transferable to other sites. Some of these practices involve contacting students in a more personal, specific, or immediate way about Tech Prep, rather than through the mass marketing approaches that have been used in the past. Interestingly, five students in the Northeast Tech Prep consortium now attending community college cited the influence of specific teachers and counselors as important to their decision to pursue Tech Prep.

- A retired career information specialist acts as a roving Tech Prep "ambassador" who visits high schools, talking to students and counselors and making presentations about Tech Prep.

- In one high school, instead of hoping students will fill out the paperwork later, for articulated credit to the community college, teachers immediately give a Tech Prep articulation application form to all students who complete (with a B or better) a professional-technical course.

- One community college will be sending counselors to the high schools, to describe the Tech Prep programs available and explain the articulation process, register interested seniors, and then follow up with interested students.

- A teacher education project links the classroom to the world of work by providing teachers with examples of workplace applications to use in instruction. Teams consisting of both vocational and academic teachers participating in the project visited local employers and developed applications to their classroom instruction. Their contributions led to a manual organized by subject matter.

- A Tech Prep consortium provided funds for the chamber of commerce in its area to hire a Business-Partnership Coordinator who recruits businesses to participate in job shadowing, internship, mentorship, or educator training. The coordinator also makes presentations to students about the work-based learning opportunities and their relationship to Tech Prep, and screens student application materials for appropriateness to the work-based experience. Those students found appropriate to a particular experience are asked to interview with the business. Selections for student participation are based on the interview process.

Tech Prep and School-to-Work Transition

Most of those interviewed for this report felt that Tech Prep was compatible with school-to-work transition, career pathways, essential learnings, and other reform efforts (aside from Running Start.) Tech Prep with its links between secondary and postsecondary education, integrated instruction, and competency-based curricula has in many cases helped establish a foundation for school-to-work transition as well as providing a distinct avenue for some students to pursue.

Impact on Participating Students

As noted elsewhere in this report, the definition of a Tech Prep student varies considerably from school to school. Particularly if a Tech Prep student is defined narrowly as one who has applied for Tech Prep credits at a community college, it is too soon to say anything about these students as a group. The number of Tech Prep graduates is still small and there are very few students at any one postsecondary institution. Some institutions have not yet enrolled any students who graduated from a secondary Tech Prep program.

On the other hand, some high schools define a Tech Prep student as anyone who has taken a course that can be used for Tech Prep credit. Using this definition the impact is much broader. Many students have been positively affected by improved curricula resulting from the collaboration of high school and community college faculty members.

It is also difficult to separate out the impacts of Tech Prep and programs such as school-to-work transition, since such programs share many elements.

Strengths and Concerns

Strengths of Tech Prep cited by those interviewed for this report included smooth transition between secondary and postsecondary education, collaboration between academic and vocational teachers, improved curricula resulting from collaboration between secondary and postsecondary instructors, and the involvement of business and industry.

Concerns included the persistence of the view of many teachers, parents, and students that a four-year degree is always preferable to a community college degree, negative attitudes toward vocational education, uncertainty about funding and the future of Tech Prep, and insufficient understanding of Tech Prep among students, parents, and educators.

Student Survey Analysis

Student survey data were collected by NWREL from four schools representing urban, suburban, and rural communities. The four high schools were Ingraham (in Seattle), Issaquah, Hoquiam, and Wapato. A total of 2,113 ninth through 12th grade students were included in the survey in May 1996. All schools used students in ninth through 12th grade, except Ingraham which elected to use only 12th grade students.

The student survey was developed by NWREL evaluation staff in cooperation with representatives from the Washington Tech Prep Consortium Directors Association, the Office of Superintendent of Public Instruction, the State Board for Community and Technical Colleges, and the Workforce Training and Education Coordinating Board. Four drafts were developed and refined over a three-month period with input from representatives of the above agencies. The intent was to select appropriate questions that could be answered by students in 15 minutes or less that covered some important demographic information as well as student experience related to career planning, school-based learning, work-based learning, connecting activities, Tech Prep, and future plans.

There were 254 Tech Prep students and 1,432 non-Tech Prep students included in the student survey. NWREL staff analyzed the data to determine the extent to which students who judged themselves to be Tech Prep students were significantly different from those saying they were not Tech Prep students.

In general the non-Tech Prep students had a higher GPA, had a mother with more years of schooling, and were more likely to intend on going to a four-year college than were Tech Prep students. There was no significant difference between the two groups in school attendance. Tech Prep students, in comparison to non-Tech Prep students from the same schools were significantly more likely to have:

- Completed an Individual Career Plan
- Taken a career interest survey
- Taken an applied mathematics class
- Taken an applied science class
- Talked to school staff about career ideas
- Planed to attend a community or technical college
- Plan to enroll in a postsecondary vocational/technical program area
- Participated in a workplace learning experience such as job shadowing or internship
- Had teachers who showed how classroom learning relates to future careers
- Had teachers who showed how what was learned in one class relates to other classes
- Participated in Running Start
- Heard of the term "Tech Prep"
- Been aware of articulated credits
- Known what occupation they plan to enter after completing their education
- Learned some of the basic occupational and related academic skills required to enter an occupation of interest
- Known what a career pathways is and to have participated in one

Conclusions and Recommendations

1. Tech Prep is starting to reach a number of secondary students in Washington. Each year, the number is growing rapidly. Data supplied by the consortium directors on the MPR survey indicate the number of students participating in Tech Prep has increased from 170 in 1992-93 to 2,203 in 1993-94 and to 11,889 in 1994-95. As Tech Prep continues to merge with school-to-work transition it will remain important to monitor the number of high school students who take articulated courses and go on to use these credits in community college.

2. In many Washington consortia Tech Prep has provided an excellent foundation for school-to-work transition and other educational reform efforts. In addition to the articulation of secondary and postsecondary courses, Tech Prep has helped educate and influence the attitude of many students and parents about the need for workplace preparation for those planning to enter a four-year college program as well as those planing to enter a community/technical college or go directly into the workplace. This message needs to continue to reach those who have not yet heard or understood it. Through practices such as the Boeing educator internship and the Workplace Applications Project both academic and vocational teachers are gaining firsthand experience regarding the skills needed in the workplace and the importance of hands-on learning. In addition, academic and vocational teachers are developing a greater respect for each other and increased willingness to work together. Since professional development is at the heart of any successful innovation, it remains critical that more educators have opportunities to see for themselves what is occurring in the workplace and how their courses can be enhanced by introducing workplace applications to what is being taught in the classrooms.

3. Many secondary students, including some who consider themselves Tech Prep students when provided with a definition on our student survey, still indicate they have not heard of Tech Prep or the process for transferring articulated credit to community colleges. Posters and snappy marketing activities are insufficient. Continued reminders to students and parents by teachers, counselors, and Tech Prep graduates are needed. Processes need to be built into the system so that all students are aware of what Tech Prep has to offer. Even if they do not remember the name "Tech Prep," they should be aware of aspects of Tech Prep such as articulated credits that are transferable to community colleges.

   Ways of reinforcing awareness of Tech Prep include having a section in each student's Individual Career Plan to list the articulated credits he or she has earned. Also, teachers can have students complete articulation credit applications as soon as they have completed the high school articulated class with a grade of B or better.

4. Students, parents, and educators will become more positive toward Tech Prep when businesses start demonstrating that they are giving hiring preferences to students graduating from high school and community college with the skills and knowledge employers say are required in today's workplace. Recent high school and community college Tech Prep graduates who have demonstrated proficiency in these skills and been hired into positions with good wages should be invited into the middle and secondary schools to tell younger students about their experiences and about how Tech Prep has paid off for them.

5. Continued effort is needed to communicate among students, parents, educators, and the community the importance of solid academic and occupational preparation for *all* students if Washington state is to achieve world class standards in workforce preparation and continued economic development. This message will need to include the importance of linking education from elementary school through postsecondary and continued adult learning, of integrating academic and technical learning, and of involving business, labor and other community groups with schools.

6. As a growing number of secondary students in Washington have work-relevant education such as Tech Prep and school-to-work transition, it is important that a systematic follow up occur annually on their activities in postsecondary education and into the workplace. The use of social security numbers is essential for linking secondary school files with postsecondary and labor market files so that group data can be used to determine the impact of work-relevant education. Since a number of secondary students transfer into or out of Washington state following graduation, we support the regional effort to access such data across the Northwest states. Parents, students, and the general public need to be reassured that individual data will be held in strict confidence and that only group data will be used for assessing the impact of work-relevant education.

INTRODUCTION

This report contains findings from the 1995-96 school year regarding Tech Prep in Washington state. The section, Statewide Findings, provides a description of implementation of Tech Prep across the state. It describes the analysis done by Northwest Regional Educational Laboratory staff based on the 1995 Tech Prep Implementation Surveys completed by all 22 Tech Prep consortium directors for the Mathematica Policy Research, Inc. national evaluation of Tech Prep. Data were supplied by MPR for each site in Washington.

The Case Studies section of the report takes a closer look at how Tech Prep is functioning in seven consortia across the state. It reports particularly on changes that have occurred during the past year, the relationship of Tech Prep to school-to-work transition and other educational reform efforts, and emerging promising practices.

The section, Student Survey, reports on a student survey of more than 2,000 students in four high schools that were part of the seven case studies. The survey describes ninth through 12th grade student experiences in school and workplaces as well as their career planning and plans for education and work after high school. Data are analyzed by grade level as well as by comparison of Tech Prep to non-Tech Prep students. A fuller introduction is presented at the beginning of each section.

With funding from the Carl D. Perkins Vocational and Applied Technology Education Act of 1990, Washington's Tech Prep initiative established a statewide network of Tech Prep programs. In Washington state, a Tech Prep program is a four-year sequenced secondary and postsecondary competency-based program that leads to an associate degree, two-year certificate, or two or more years of apprenticeship training; it provides technical preparation in one or more specific occupational fields and builds students' competency in mathematics, science, and communications through a sequential course of study that leads to placement in mid-level technical occupations.

Administered by the State Board for Community and Technical Colleges, the program has undergone five funding cycles since its inception in March 1992. Phase I awarded five planning and five implementation grants; Phase II, four new planning and five new implementation grants; and Phase III, 10 new planning, eight new and continued implementation grants, and three demonstration grants. Phase IV awarded one continuation planning grant, and 15 new and continued implementation grants. In Phase V, 22 administrative grants were awarded and seven implementation grants were awarded in September 1995.

The Carl Perkins Technology Act was authorized for five years and extended for two years. The State Board for Community and Technical Colleges has no authorization to provide continued funding beyond the five-year period of the act. Planning grants cover one year only. Implementation grants for Phases I, II, and III ran three years and received 100 percent funding the first year, 50 percent the second year, and 25 percent the third for two years with 100 percent funding the first year and 50 percent funding the second year Phase 5 grants are for one year

STATEWIDE FINDINGS

Introduction

This section of the report describes the findings from the 1995 Mathematica Policy Research, Inc. Tech Prep Implementation Survey completed by all 22 consortium directors in Washington. NWREL arrangements with Mathematica Policy Research, Inc. have allowed us to obtain a data disk containing responses from these consortium directors to use in preparing a statewide report for Washington. By doing so, we have enabled the same data collected by these consortium directors to satisfy both federal and state needs for implementation data without duplicating the consortium director's efforts.

The Mathematica Policy Research, Inc. "Inventory of Local Tech Prep Planning and Implementation" contained 48 pages of questions used to provide a comprehensive description of Tech Prep in the fall of 1993, 1994, and 1995. This section is based on selected findings from those surveys. Emphasis has been given to those areas for which the Tech Prep consortia in Washington had reasonable data at the time.

This discussion covers 11 areas of findings.

1. Core elements of Tech Prep
2. Description of Tech Prep students
3. Articulation
4. Curriculum development
5. Counseling and guidance
6. Student outcomes
7. Consortium governance
8. Funding
9. Business/industry involvement
10. Perceived strengths
11. Perceived limitations

Findings

1. Core Elements of Tech Prep

While most people may agree on the basic outcomes desired for Tech Prep programs, there is no universal agreement on what core elements should be required of all Tech Prep students. Even in cases in which a consortium director communicates a clear idea of what is required, there is often wide variation in practice across high schools within the consortium. The U.S. Department of Education has refrained from imposing a list of core elements required of all students.

The Mathematica Policy Research, Inc. survey identified 10 elements that could be considered core for Tech Prep programs. Most consortia in Washington did not require core elements of Tech Prep. Table 1, based on responses from three consortia in 1993, five in 1994, and eight in 1995, shows elements considered essential for Tech Prep. In 1995 seven of the eight consortia required Tech Prep students to take one or more applied academics courses and choose a broad career cluster. In 1995, none of the consortia required students to have a paid youth apprenticeship or be assigned to a workplace mentor.

Because a varying number of Tech Prep consortia responded to the different questions on the survey, each table has a designation for reporting the number of consortia responding in each year (1993, 1994, and 1995) such as N = 3, 5,8 as in Table 1. In Table 1, only three, five, or eight consortia respectively had core elements required of *all* Tech Prep students.

Table 1

Number of Consortia Requiring Identified Core Elements of Tech Prep

(N = 3, 5, 8)

Core Elements of Tech Prep	Number of Consortia Requiring Elements		
	1992-93	1993-94	1994-95
Completion of student plan	3	4	6
Choice of a broad career cluster	2	4	7
Choice of an occupational specialty	1	2	6
Applied academic courses	3	4	7
Required academic or occupational courses related to a career cluster	3	5	6
Required number of career-related courses	3	3	5
Career development classes/individual guidance	3	0	3
Workplace exposure/instruction	2	0	1
Paid youth apprenticeship	0	0	0
Assignment to workplace mentor	0	0	0

2. Description of Tech Prep Students

A key challenge in the evaluation of Tech Prep across the country is the definition of Tech Prep students within and across consortia. A Washington state Tech Prep Consortium Committee worked for more than six months in 1996 to reach agreement on the following definition of secondary Tech Prep: "those students in grades nine through 12 who are enrolled in a sequence/program of competency-based studies articulated between the high school and a community or technical college or a trade-recognized apprenticeship." (Identifying Tech Prep Students draft memo submitted by Marie Coon on behalf of Dave Pavelchek, Rob Fieldman, Carilyn Norris, and Tom Owens, updated 4/23/96)

Washington consortium directors often selected four essential elements in defining secondary Tech Prep students. Table 2 shows the elements identified by each site. As shown in Table 2, of the 20 coordinators responding to this survey question, 17 selected the need for students to develop an educational plan, 16 required students to take vocational/technical courses, 11 required students to elect to be in Tech Prep, and seven required students to take at least one applied academics class. Five coordinators required all four elements for students to be considered in Tech Prep. These definitions are important when we discuss the number of Tech Prep students later in this report.

Table 2
Definitions of Tech Prep Students in 1994-95

	Consortium	Definition Elements*			
		1	2	3	4
1.	Site A	x	x	x	x
2.	Site B	x	x	x	
3.	Site C		x	x	
4.	Site D		x	x	
5.	Site E	x	x	x	
6.	Site F	x	x	x	
7.	Site G	x	x	x	x
8.	Site H			x	
9.	Site I	x	x	x	
10.	Site J	missing	missing	missing	missing
11.	Site K	x	x		x
12.	Site L	x	x	x	x
13.	Site M		x	x	
14.	Site N	missing	missing	missing	missing
15.	Site O	x	x	x	
16.	Site P	x	x	x	x
17.	Site Q		x		
18.	Site R	x	x	x	x
19.	Site S		x		
20.	Site T				x
21.	Site U			x	
22.	Site V		x	x	
	Total	11	17	16	7

*Note: 1 = Student elects Tech Prep
2 = Student develops plan
3 = Student takes vocational/technical courses
4 = Student takes applied academic courses

In the fall 1993 survey, only one Tech Prep consortium had student data to report. By 1994, the number of consortia had jumped to 10 and by 1995 it had risen to 13. The consortia reporting in 1993-94 had 2,203 Tech Prep students, while the 1994-95 enrollments in Tech Prep climbed to11,889. Table 3 shows the breakout of reported Tech Prep students by grade level for both years. In 1995 there was a higher percentage of Tech Prep students in grades nine, 11 and 12. This probably reflected the 11th and 12th graders continuing Tech Prep as well as the programs that started reporting first year students as ninth graders. For comparative purposes, Table 3 also shows the total number of secondary vocational/ technical students in the reporting consortia. Tech Prep represented about 4 percent of the vocational/technical students in 1993-94 and 15 percent in 1994-95.

Table 3
Number of Tech Prep and Vocational/Technical Students in Participating Districts for 1993-94 and 1994-95
(N = 10, 13)

	Tech Prep Students		Vocational/Technical Students	
Grade	1993-94	1994-95	1993-94	1994-95
9	347	4.970	15.690	18.355
10	533	1.644	13.463	20.564
11	643	2.489	12.118	19.756
12	680	2.786	11.533	21.019
Total	2.203	11.889	52.804	79.694

To gain a better understanding of the distribution of Tech Prep students in Washington, it is useful to consider the number of students by consortium. One consortium reported 4,193 Tech Prep students while another reported only 13 students.

Tech Prep students represent a diversity of characteristics. Table 4 shows the distribution of reported secondary Tech Prep students by race/ethnicity, gender, and special population status. Approximately 23 percent of the students reported were non-White, and 42 percent were reported as female. In terms of special characteristics, 4 percent were Limited English Proficient, 8 percent were students with disabilities and 31 percent were considered economically or educationally disadvantaged.

Table 4

Characteristics of Secondary Tech Prep Students for 1994-95

(N = 14)

Characteristic	Percentage of Students 1994-95
Race/Ethnicity	
White	77
Black	5
Hispanic	8
Native American or Alaskan Native	4
Asian/Pacific Islander	6
Other	0
Gender	
Male	58
Female	42
Special Populations	
Economically/educational disadvantaged	31
Disabled	8
Limited English proficient	4

Reported Tech Prep students were concentrated in the business/office/marketing career cluster. This cluster enrolled more than half of all the Tech Prep students. The student data in the Mathematica report are all based on 1994-95 enrollments except for the question about enrollments of students by career cluster shown below in Table 5. This table is unique in that it is based on the 1995-96 school year. Thus, the numbers reported in Table 5 are larger than the numbers of Tech Prep students reported by grade level for 1994-95.

Table 5

Enrollment of Secondary Tech Prep Students by Career Cluster, 1995-96

(N = 5)

Career Cluster	Enrollment 1995-96
Business/office/marketing	4,552
Engineering/technology	1689
Mechanical/industrial/trade	1,409
Health/human services	1,109
Agriculture	317
Other	537
Total	9,613

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3. Articulation

Articulation agreements are formal, signed arrangements between secondary schools and community colleges that enable community colleges to accept for credit certain high school courses that are part of a Tech Prep sequence. Articulated courses allow students to take higher level courses at the community college or complete their associate degree sooner. They also help to standardize course work for students and avoid duplication. Table 6 identifies the characteristics of these articulation agreements. The most common feature of these agreements allows students who complete approved secondary courses to skip prerequisite or introductory courses at the postsecondary level. As seen in Table 7, out of 22 consortia, eight had agreements in agriculture, 17 in business/office/marketing, seven in engineering/ technology, 11 in health/human services, and 15 in mechanical/ industrial/trade.

Table 6

Agreements Employing Identified Characteristics of Articulation Agreements

(N = 15, 21)

Articulation Agreement Characteristic	Number of Agreements with Characteristic 1993-94	1994-95
Identify secondary courses or competencies for which postsecondary credits will be granted towards a certificate or degree, or that will allow students to skip prerequisite or introductory courses at the postsecondary level	23	41
Changing the content or competencies covered in postsecondary courses that are part of occupational sequence to eliminate gaps or duplication	3	27
Defining/changing the content or competencies covered in secondary courses that are part of an occupational sequence	9	28
Granting of advanced standing in apprenticeship programs based on secondary school program completion	3	2
Providing for joint or exchange teaching involving secondary and postsecondary instructors	0	8
Working with secondary partners to identify a sequence of required and elective courses or competencies at secondary and postsecondary levels to create a four-year program of study	15	19
Assuring/guaranteeing postsecondary spaces for graduates of secondary Tech Prep programs	5	12

Table 7

Career Cluster Emphasis of Articulated Programs

(N = 22, 22)

Career Cluster	Number of Articulated Programs 1994	1995
Agriculture	2	8
Business/office/marketing	10	17
Engineering/technology	8	7
Health/human services	3	11
Mechanical/industrial/trade	11	15

4. Curriculum Development

As schools become involved in Tech Prep and in efforts to integrate academic and occupational education, many start by purchasing and using commercially developed materials such as those produced by the Center for Occupational Research and Development (CORD) and the Agency for Instructional Technology (AIT). Table 8 indicates the number of consortia and secondary and postsecondary schools that reported using commercially available applied academics curricula. Applied Mathematics, Applied Communications, and Principles of Technology were used by one or more schools in at least 18 consortia in 1994-95. Over the past three years the number of secondary schools using Principles of Technology went from 83 to 98 to 91 and the number using Applied Math increased from 97 to 115 to 140. The number using Applied Communications increased from 85 in 1993-94 to 111 in 1994-95. The number using Applied Economics in 1993-94 was five and increased to 26 in 1994-95. Chemistry in the Community increased from five to 28 over the last two years and Applied Biology/Chemistry increased from 17 to 29.

Table 8

Use of Commercially Available Applied Academics Curricula

(N = 19, 21)

	Number of Consortia		Number of Secondary Schools		Number of Postsecondary Schools	
Curriculum	1993-94	1994-95	1993-94	1994-95	1993-94	1994-95
Applied Biology/Chemistry	6	9	17	29	1	2
Applied Communication	15	18	85	111	7	7
Applied Economics	3	6	5	26	0	0
Applied Mathematics	16	19	115	140	7	7
Chemistry in the Community	3	4	5	28	0	0
Principles of Technology	19	19	98	91	6	7
Other	1	2	1	11	1	2

In terms of vocational curricula offered in the consortia, the most frequently identified areas were business/office/accounting, engineering/technology, mechanical/industrial trade, health/human services, and agriculture. Table 9 shows the number of consortia having at least one school with such vocational curricula.

Table 9

Consortia with Defined Tech Prep Career Cluster Curricula*

(*At least one school implements vocational curriculum in the cluster)

(N = 13, 18)

Career Cluster	Number of Consortia 1993-94	 1994-95
Business/office/marketing	13	13
Engineering/technology	10	16
Mechanical/industrial/trade	10	14
Health/human services	8	15
Agriculture	7	13

5. Counseling and Guidance

Virtually all consortia have counseling and guidance activities for Tech Prep occurring in many schools. The Mathematica Policy Research, Inc. survey asked consortia to report on the types of career development occurring in their schools. Table 10 shows the activities reported for all or some schools within their consortia. It breaks out the activities at the elementary, secondary, and postsecondary levels. At the secondary level, at least three-quarters of the consortia reported having career development integrated into academic or vocational classes, individual counseling, career exploration software, trips to worksites, special career development classes, development of secondary/postsecondary student plans, and special Tech Prep counseling materials. At the postsecondary level, three-quarters of the consortia reported individual counseling, career development integrated into academic or vocational classes, career exploration software, trips to worksites, job placement by course instructors or special placement staff, and special career development classes.

6. Student Outcomes

While it is too soon to be able to detect outcomes on graduate data for a large number of Tech Prep students, Table 11 presents findings for the past two years. Table 11 shows the status of 126 Tech Prep program graduates reported by eight consortia in 1994 and 197 graduates from seven consortia in 1995 in terms of their future education. The numbers shown are probably both an undercount and somewhat misleading. Often, the coordinators do not know what happens to their graduates after they leave high school. This is particularly true of students not going on to the local community college.

Table 10
Consortia Providing Career Development at Some or All Schools
(N = 22, 22)

	Number of Consortia					
	Grade 8 or Earlier		Grades 8 to 12		Postsecondary Level	
Career Development Activity Type	1993-94	1994-95	1993-94	1994-95	1993-94	1994-95
Special career development classes	8	14	17	21	16	19
Career development integrated into academic or vocational classes	11	16	19	21	20	20
Individual counseling	8	10	20	21	20	21
Special Tech Prep counseling materials	4	12	12	17	7	13
Development of secondary/postsecondary student plans	2	9	11	20	5	8
Career exploration software	7	15	20	21	17	20
Trips to worksites	6	14	18	21	17	18
Job placement by course instructors	NA*		13	10	19	18
Job placement by guidance counselors	NA		14	13	11	13
Job placement by special placement staff	NA		10	10	14	18
Other	0	2	0	1	0	2

*NA = Not applicable

Table 11
Educational Activities of Tech Prep Graduates
(N = 8, 6)

Institution/Activity	Number of Students	
	1993-94	1994-95
Community colleges, junior colleges, and technical colleges	111	152
Four-year colleges or universities	7	27
Proprietary postsecondary schools	0	0
Registered apprenticeships	3	12
Armed forces	5	6
Other	0	0
Total	126	197

7. Consortium Governance

Many educators and business people are involved in planning and implementing Tech Prep in Washington. Table 12 shows the reported number of people by type who have been involved. There was an increase in the number of school districts and secondary schools involved in planning or implementing Tech Prep. These numbers are somewhat inflated since there is an overlap across Tech Prep consortia. For example, Table 12 shows 37 community, junior, and technical colleges involved while there are only a total of 32 in the state. However, some community colleges are situated in more than one consortium. The mean or average number of people per group remained relatively the same as in the prior year while the total number of groups involved increased.

Table 12
Number of Agencies Involved in Planning or Implementing Tech Prep in Washington State
(N = 22, 22)

Type of Institution/Organization	Total Number Involved		Mean	
	1994	1995	1994	1995
Local school district that has any schools actually engaged in planning or implementing Tech Prep	165	188	7.5	8.5
Secondary school actually engaged in planning or implementing Tech Prep	260	292	11.8	13.3
Independent area vocational/technical center or district	17	19	.8	.9
Independent area vocational/technical center actually engaged in planning or implementing Tech Prep	17	17	.8	.8
Community college, junior college, and technical college	37	38	1.7	1.7
Four-year postsecondary institution	11	17	.5	.8
Postsecondary proprietary institution	1	1	.1	.1
Postsecondary apprenticeship program	7	9	.3	.4
Other educational agency	17	24	.8	1.1
Business/corporation	168	230	7.6	10.5
Business/industry or trade association	15	17	.7	.8
Individual labor group	40	63	1.8	2.9

It is important in considering the governance of Tech Prep to determine who serves on the consortia's governing boards. Table 13, reflecting findings from the Mathematica Policy Research, Inc. surveys, indicates that 19 or more of the Washington consortia involved secondary administrators, postsecondary administrators, and business representatives. The greatest growth was in the number of consortia having company representatives which went from 11 to 19. It is interesting to note though that three consortia did not report having company representatives on their governing boards.

Table 13

Representation on Consortium Governing Boards

(N = 22, 22)

Type of Members	Number of Consortia 1993-94	Number of Consortia 1994-95
District/school administrator	20	19
Postsecondary administrator	20	22
Company representative	11	19
Postsecondary faculty	9	9
Business/industry associate	12	12
Secondary counselor	8	7
Postsecondary counselor	2	4

8. Funding

The largest source of funding in Washington and elsewhere for Tech Prep planning and implementation is Title III E of the Carl Perkins Act. Title III E sources contributed approximately $72,000. Local and business funds have been added to supplement the Perkins grants. Table 14 indicates the mean (average), and maximum of each source of funding.

In addition to knowing the source of funds, it is equally important to know how they are being used. Table 15 shows the percentage of funds used for various expenditures over the past three years. Most funds are used for general administration of the consortia and for staff development. The percentage used for curriculum development, equipment, and materials has increased over the past three years. The percentage of funds spent on evaluation by consortia has remained small.

Table 14
Sources for Tech Prep Funding
(N = 21, 22)

Funding Source	Mean		Maximum	
	1993-94	1994-95	1993-94	1994-95
Perkins Act Title IIIE Tech-Prep grant	$72,201	$70,801	$150,000	$130,000
Perkins Act Title IIC funds	9,461	7,853	65,000	62,500
Other Perkins Act funds	1,372	2,711	22,870	33,000
State funds	3,356	0	48,969	0
Financial contributions by consortium members	8,103	8,272	75,000	85,461
Financial contributions from: • Businesses/corporations, • Business/industry or trade associations, • Labor organizations	10,000	11,727	50,000	75,000
Financial contributions from foundations	0	5,909	0	40,000
Other local funds	1,750	1,318	22,938	20,000
Other	30,295	3,227	181,766	70,000

Table 15
Types of Tech Prep Expenditures
(N = 15, 20, 22)

Expenditure Area	Percent Mean		
	1992-93	1993-94	1994-95
General administration of the consortium	29	25	28
Staff development activities	28	31	21
Curriculum development and review	12	19	22
Equipment or materials for secondary and/or postsecondary programs	8	11	14
Marketing/promotion	5	4	5
Evaluation activities	1	2	.9
Allocations made by the consortium to consortium educational institutions for their use	10	8	6
Other	8	4	3

9. Business/Industry Involvement

Although there are many ways to classify business involvement in Tech Prep, the Mathematica Policy Research, Inc. staff decided to organize the types of assistance under three categories: working with students, working with staff, and providing material resources. In terms of working with staff, Table 16 indicates that more than half the consortia reporting provided facility tours, assistance to educators in developing curricula, and speakers and/or classroom instructors. Compared with the previous year there were four less consortia reporting business involvement in supporting staff development and in defining desired outcomes. While the latter might be expected as a result of programs already having outcomes already in place, it is disappointing to see the drop in support for staff development. Of the 20 consortia reporting on this question on the survey none reported businesses giving priority for hiring Tech Prep graduates. If Tech Prep is delivering on its commitment to business to prepare the types of graduates business is expecting it seems only fair that students coming out of such programs could expect priority in being hired.

Table 16

Type of Business and Industry Involvement

(N = 10, 18, 20)

Type of Assistance	Number of Consortia 1992-93	1993-94	1994-95
Working with Students			
Providing facility tours or other career awareness events	2	13	13
Priority for hiring graduates	0	1	0
Providing youth apprenticeship and/or worksite learning slots	7	9	6
Working with Staff			
Developing curricula	6	13	15
Helping support staff development	6	12	8
Providing speakers and/or classroom instructors	3	10	10
Defining desired outcomes	7	13	9
Helping define career areas	5	7	6
Providing Material Resources			
Equipment, materials, space	3	8	5
Awards and scholarships for students	1	4	4

10. Perceived Strengths

Consortium directors were asked to identify the most successful aspects of their Tech Prep consortia at the secondary and postsecondary levels. The responses, shown in Table 17, were relatively similar for the secondary and postsecondary levels. Compared with the prior year there was a 20 percent growth in number of consortium directors reporting success at the secondary level in collaboration between secondary and postsecondary educators and in developing articulation agreements. Conversely 20 percent or more of the consortium directors failed to report satisfaction with the collaboration between vocational and academic educators at the secondary level in 1995. At the postsecondary level, there was a 20 percent or greater increase in the number of consortium directors expressing satisfaction with the articulation agreements, collaboration between secondary and postsecondary educators, and integration of Tech Prep into larger reform efforts.

Table 17
Successful Aspects of Tech Prep Consortia
(N = 22, 22)

	Number of Consortia			
	Secondary Level		Postsecondary Level	
Tech Prep Aspect	1993-94	1994-95	1993-94	1994-95
Developing administrative support	14	14	13	17
Collaboration between secondary and postsecondary educators	16	21	15	22
Collaboration between vocational and academic educators	13	8	7	10
Establishing and adopting clearly defined Tech Prep guidelines/objectives	9	11	8	7
Developing articulation agreements	10	19	9	20
Providing a high degree of involvement and support at the state level	6	5	5	8
Obtaining the support/involvement of business/industry and labor	12	11	12	13
Building networks with other Tech Prep programs for mutual assistance/advice within the state	9	8	12	10
Developing increased awareness of Tech Prep in the educational community and the public	11	11	10	9
Integrating Tech Prep into larger reform efforts	9	12	4	9
Applying the TQM* approach to implementation	2	2	1	1
Other	0	2	0	1

*TQM = Total Quality Management

11. Perceived Limitations

The Washington Tech Prep consortium directors identified for both the secondary and postsecondary levels "the lack of staff, time, and money dedicated to Tech Prep" as the greatest obstacle, followed by negative attitudes toward vocational education and/or Tech Prep, and a lack of truly integrated curricula. These were also the top barriers identified by Tech Prep consortium directors across the country. Only a few consortium directors reported obstacles in negotiating Tech Prep articulation agreements. Table 18 provides responses of both secondary and postsecondary levels.

From a state-level perspective, it is important to note that more than a third of the consortium directors indicated a problem with conflicts with other reform efforts. This suggests the need to help local educators see how Tech Prep fits with these other educational reforms.

Table 18

Greatest Obstacles to Tech Prep Implementation Identified at the Secondary and Postsecondary Levels

(N =22, 22)

Tech Prep Obstacle	Number of Consortia Secondary Level 1993-94	 Secondary Level 1994-95	 Postsecondary Level 1993-94	 Postsecondary Level 1994-95
Negative attitudes toward vocational education and/or Tech Prep	12	18	10	14
Resistance of vocational educators to change	7	9	7	8
Resistance of secondary schools to replacing the general track	13	15	NA	
Turf battles between secondary and postsecondary educators	10	7	10	8
Difficulty of defining curriculum reform/revising curricula	8	10	7	8
Difficulty in negotiating articulation agreements	1	3	3	4
Lack of definition of student participation in Tech Prep	6	9	4	7
Lack of truly integrated curriculum	14	13	10	12
Lack of support/involvement for Tech Prep among local administrators	8	7	6	6
Lack of collaboration between secondary and postsecondary educators	4	3	4	2
Lack of collaboration between vocational and academic educators	8	12	8	12
Lack of staff, time and money dedicated to Tech Prep	17	18	14	19
Lack of support/involvement of business and industry	9	4	7	5
Lack of business and industry in the state/region	0	4	0	4
Difficulty accessing sources of information about how to develop Tech Prep	0	2	0	2
Constraints/conflicts in class scheduling	4	7	1	5
Problems defining Tech Prep guidelines/objectives	6	6	4	3
Conflicts with other reform efforts	12	9	9	8
Application of the TQM* approach to implementation	1	3	1	3

*TQM = Total Quality Management

CASE STUDIES

Introduction

As part of the overall evaluation of the Tech Prep programs in Washington state, Northwest Regional Educational Laboratory (NWREL) staff conducted case studies of seven local Tech Prep consortia. These in-depth studies are intended to identify and document in some detail for the seven consortia an overview of the community and consortium, changes over the past year, promising practices noted, relation to school-to-work transition, impact on participating students, and perceived strengths and concerns.

The sites selected for study were the Northeast Tech Prep Consortium, Seattle Tech Prep Consortium, Twin County Tech Prep Consortium (Grays Harbor and Pacific counties), Yakima Valley Tech Prep Consortium, Columbia Basin Tech Prep Consortium, South King County Tech Prep, and Northeast Washington Technical Education Consortium (Spokane). The first four represent consortia that were also studied by NWREL the previous year, while the last three were added for 1996. They reflect diversity in geographic location, setting (urban and rural), student composition, and consortium size.

Northeast Tech Prep Consortium

Community Overview

The Northeast Tech Prep Consortium is located in urban east King County, Washington. The primary sources of economic growth in east King county include business, retail, insurance, and finance. There is some small manufacturing (for example, the preferred defibrillator used by emergency medical technicians is made here) and growing high tech activities (Microsoft and computer software-related enterprises). The Puget Sound area forms the economic base. The aerospace industry, particularly The Boeing Company, plays a significant role. East King County has a mixed economic base. Health care, hospitality, and other service sector industries are major players in the regional economy.

Consortium Overview

Various reform initiatives were in place in the area before the advent of Tech Prep. The school districts, for example, had a head start on Tech Prep with the formation of the Northeast Vocational Area Cooperative (NEVAC). NEVAC includes nine districts which cooperate on equity training, career specialist training, and other inservice training. NEVAC districts pool resources, and this cooperative funding has supported transportation so students may enroll at no cost in vocational programs in high schools outside their attendance areas. An eight-year tradition of monthly gatherings made it easier for NEVAC to reach out and include the community colleges in dealing with the many issues involved in Tech Prep.

Before Tech Prep funding became available, Juanita High School faculty adopted the Principles of Technology curriculum, an applied physics model funded by The Boeing Company. This initiative helped staff promote Tech Prep activities and development to administrators and other faculty by providing credibility to the course.

The consortium encompasses schools in nine municipalities and includes 30 high schools in the northeastern and eastern suburbs of Seattle, such as Bellevue, Edmonds, and Issaquah. The postsecondary partners are the Art Institute of Seattle; Bellevue, Edmonds, and Shoreline community colleges; Lake Washington Technical College; Seattle Central Community College (for woods construction only); and the University of Washington. Funding for the Northeast Tech Prep Consortium began in May 1992.

Schools in the Northeast Consortium are actively involved in reform initiatives, with several districts moving toward site-based management. Two districts have 21st Century Schools grants and state-funded School-to-Work grants. The national New Standards Project is also being implemented in Edmonds School District. This area has a history of introducing innovations in education, such as ungraded elementary classes in middle schools.

The population in the area is predominantly upper middle-class Caucasian with a growing Asian and Hispanic population. The community colleges have a more diverse student body than do the secondary schools.

Changes and Accomplishments Since Last Year

During the 1995-96 school year the following major accomplishments in the Northeast Tech Prep Consortium took place:

- Sixty-six clearly-identified Tech Prep students transferred into local community and technical colleges in the consortium with advanced standing and earned credit. Several of these see themselves as transfer students, not intending to stop with an associate degree.

- The consortium produced and distributed new Tech Prep materials including the following:

  "Simply Tech Prep," a handbook for counselors, teachers, and students in the Northeast Tech Prep Consortium. The handbook begins with answers to typical questions about Tech Prep, such as "What are the advantages of Tech Prep?" and "What career choices are available through Tech Prep?" This is followed by information directed at the school counselor, the teacher, and the student. The counselor section contains charts showing Tech Prep courses available in each consortium school district and other charts for each community college showing which high school courses are eligible for credit and which courses they correspond to at the community college level. A reference section includes a glossary of terms and grids for each community college showing the recommended sequence of courses for each program from ninth through 14th grade.

  Ten thousand Tech Prep book covers and 1,000 Tech Prep posters. These went to the 30 high schools in the consortium. As well, signs that go over classroom doors indicating "this course carries college credit" have been very effective.

  "Resource for Vocational Instructors with Special Needs Learners." This handbook, developed in partnership with the Northeast Vocational Area Cooperative and the King County Vocational/Special Education Cooperative was distributed to vocational directors, Tech Prep building contacts, and team leaders. It includes sections on laws related to people with disabilities, terms and definitions, the instructor's attitude, building self-esteem, teaching techniques, peer teaching, and Tech Prep.

  A job outlook chart from the May 1995 *Wall St. Journal*. This was reproduced and sent to vocational directors, Tech Prep building contacts, and team leaders.

The quarterly "Northeast Tech Prep Update." The newsletter was sent to superintendents, assistant superintendents, principals, assistant principals, vocational directors, and all high schools.

More than 20,000 families in the nine school districts received two postcards, one in December and one in January, listing the names and phone numbers of Tech Prep counselors and programs available in the district.

- A roving Tech Prep ambassador, Joanne Harkonen, retired career information specialist, contacted students and made presentations in the high schools.
- Boeing accepted 25 students for summer internships, five each from Bothell, Inglemoor, Meadowdale, Mountlake Terrace and Mount Si high schools. Five teachers from consortium high schools and community colleges will also participate.
- The consortium participated in a King County-area Pre-Tech Prep program for ninth and 10th graders at risk of dropping out at Shorewood High School in Shoreline and Interlake High School in Bellevue. The program served 150 students. Each site had a different curriculum but some common elements included career decision-making activities, job shadowing, paid work experience, introduction to Tech Prep, field trips to businesses and postsecondary institutions, career speakers, job search skills training, group activities that teach SCANS competencies, basic skills remediation, and instruction in life skills competencies. The Northeast Tech Prep Consortium coordinator provided information about Tech Prep and helped the two programs.

Under development are an articulation agreement in Information Technology as part of a Northwest Center on Emerging Technologies at Bellevue Community College. This National Science Foundation-funded project includes Tech Prep-type curriculum.

Promising Practices

Those interviewed for the case study suggested several promising practices related to Tech Prep:

- The vocational-technical director at one school district described the roving Tech Prep ambassador as "outstanding" and said she was really making a difference. The ambassador visits Tech Prep classes and talks to students and counselors.
- In the Edmonds School District, when a student takes a professional-technical course and completes it with B (which is what is needed to qualify for community college credit), the teacher gives the student a Tech Prep application at that time, rather than just waiting and hoping the student will follow up.
- Some employers are seeing their partnerships with schools and community colleges as a way of getting new employees. According to one of the district vocational directors,

one of the MTAG companies has said it will not hire a new employee who has not gone through the program.

- Using in-house television, one high school did an in-class 1 to 2 minute spot about job shadowing. They plan to make more use of in-house television. The counselor at this school believes that brochures do not work with high school age students. They need role models. He recommends promotional video spots with real Tech Prep students who are two years older than the audience. He would also like to see postsecondary Tech Prep students coming to the high school and talking about community college and the careers they plan to go into.

- At Bellevue Community College the workforce counselor sent flyers to the high schools about orientations for specific programs at the college. It helped spur some interest in the programs and she hopes it will encourage students to take classes that can prepare them for those programs.

Tech Prep and School-to-Work Transition

Among district, high school, and community college staff there is agreement that Tech Prep is a strong and very substantive avenue for school-to-work transition. Tech Prep fits in with school-to-work goals of work-based learning and a coherent sequence of courses. It links career planning and training at the high school level with postsecondary education and legitimizes options other than the baccalaureate for transition from school to work. Tech Prep also fits with career pathways. In some cases there are several Tech Prep programs in one pathway. Tech Prep seems to be consistent with most reform efforts, except for Running Start.

The Northshore School District is involved in establishing a regional school-to-work transition consortium. They are recruiting CEOs, county leaders, labor representatives, and others. Tech Prep will be part of it.

By next year Edmonds Community College will have a requirement that all Tech Prep students have an internship while at the college.

Impact on Participating Students

The impact of Tech Prep on participating students depends partly on the definition of a Tech Prep student. At the community college level, the definition is usually narrow: a Tech Prep student is one who applies for the Tech Prep credits. At the secondary level, however, a Tech Prep student is sometimes considered to be anyone who takes a class eligible for community college credit. Often people are using the term in very different ways. For instance, while the director of vocational-technical education of Lake Washington School district was very pleased to have 1,333 students in what was termed "Tech Prep classes," a counselor at one of the high schools in the district said the school had no Tech Prep students this year and only one last year.

Some counselors feel students are more interested in postsecondary options and are more focused earlier in high school. Not all of this can be attributed to Tech Prep, but the combination of Tech Prep and career pathways has caused students to look at how courses fit together and how they relate to careers and postsecondary options—even though there is not a pervasive "cultural support system" that acknowledges the value of two-year associate degrees in technical fields. Indeed, data seem to indicate that about 20 percent of all high school graduates have the ability to move on to four-year university programs and actually graduate. According to the Tech Prep coordinator, the Tech Prep target audience—particularly the so-called neglected majority—is still having trouble "getting it together" enough to enter and succeed in a clear pathway in a timely fashion. She attributes this to a pervasive attitude that still gives greater dignity and recognition to graduates with a four-year degree even though skilled openings in the area are going begging.

One district vocational director noted a definite beneficial impact on students who participated in MTAG. Four out of the first five participants from that district raised their grades from C-/D to A-/A. The director felt the work-based learning component of this program was a huge motivator.

Possibly the biggest impact on students, if Tech Prep students are defined broadly as anyone who takes a Tech Prep class, is that Tech Prep has unquestionably improved the quality of vocational course offerings. Because of Tech Prep, competencies and course content have been rigorously reviewed in collaboration with community college faculty members and business representatives. Enrollments in professional-technical courses are increasing.

At the community college level there have been so few students at any one institution that it is difficult for anyone to generalize about whether these students are better prepared than their counterparts who are not Tech Prep graduates. Tech Prep students are getting college credit for work done in high school, they can register early, and get additional advising. The workforce counselor at Bellevue Community College noted that most Tech Prep students seem more motivated, get better grades, and tend to be better quality students, but wasn't sure whether this was because Tech Prep programs produce such students or because these programs tend to attract better students in the first place.

Five Tech Prep students were profiled in the winter issue of the Northeast Tech Prep Update. These students—now at Shoreline, Bellevue, and Edmonds community colleges, and at Lake Washington Technical College—had chosen to pursue degrees in accounting, manufacturing, office administration, hotel management, and a transfer degree. Three were from Inglemoor High School, one from Newport High School, and one was from Woodinville High School and had participated in NEVAC shared or transfer options as well. All cited the influence and encouragement of specific high school teachers or counselors as significant in putting them on the Tech Prep path.

Strengths and Concerns

Strengths. On the Mathematica Policy Research Inventory of Local Tech-Prep Planning and Implementation, the director of the consortium identified the following as successful aspects of the consortium program at both the secondary and postsecondary level

- Developing administrative support
- Collaboration between secondary and postsecondary educators
- Collaboration of vocational and academic educators
- Establishing and adopting clearly defined Tech-Prep guidelines/objectives
- Developing articulation agreements
- Providing a high degree of involvement and support at the state level
- Obtaining the support/involvement of business/industry and labor
- Building networks with other Tech-Prep programs for mutual assistance/advice within the state
- Developing increased awareness of Tech Prep in the educational community and the public
- Integrating Tech Prep into larger reform efforts

In interviews, collaboration of secondary with postsecondary faculty was frequently mentioned as a strength of Tech Prep. Collaboration produced the following benefits tighter curriculum, improved self-esteem in secondary teachers, greater familiarity of secondary teachers with specific community college programs and teachers.

Concerns. Some of those interviewed feel Tech Prep is having some unintended consequences at the community college level. There are concerns that some students are using the system to get a start on college by accumulating some credits and qualifying for early registration, rather than to get a start on a career track by taking a sequence of courses. A considerable number of the Tech Prep students register as undecided or sign up for a transfer degree rather than a technical degree. They are likely misinformed about the status of the credits and do not understand that only 15 credits will transfer to a four-year institution and then only as free electives.

There is also misunderstanding about the purpose of Tech Prep among some admissions and advising staff and among some high school counselors.

Tech Prep is feeling competition from Running Start, a program which allows high school students to take courses at a community college and receive both high school and college credit. Under this program the high school loses funding to the community college where the credits are earned. Students think Tech Prep is like Running Start—a way of getting college credits—but they prefer Running Start because going to college is more prestigious than getting the credits at the high school. There are many more Running Start students than Tech Prep students.

One counselor felt Tech Prep is too little, too late, an add-on at the end of the system when what is needed is comprehensive, developmentally appropriate K through 12 career awareness, career exploration, and hands-on experience.

On the Mathematica Policy Research Inventory of Local Tech-Prep Planning and Implementation, the director of the consortium identified the following as obstacles or problems for the consortium at both the secondary level and postsecondary levels:

- Negative attitudes toward vocational education and/or Tech Prep
- Resistance of secondary schools to replacing the general track
- Lack of support/involvement for Tech Prep among local administrators
- Lack of collaboration between vocational and academic educators
- Lack of staff, time, and money dedicated to Tech-Prep
- Lack of support/involvement of business and industry
- Conflicts with other reform efforts

In an interview the director also mentioned as a problem that the Higher Education Coordinating Board is raising standards for university admission and that this then ripples down to the community college level. With more requirements for university admission, less room is left in students' schedules for vocational electives or a Tech Prep sequence. Another problem is that high school curricula in this area still mainly reflect a university orientation because this is still what the most vocal group of parents think their children should have. However, as people become more aware of under- and unemployment among people with bachelor's degrees, people are becoming more receptive to programs such as school-to-work transition and Tech Prep. The director feels a taskforce of principals is needed to advocate for Tech Prep. She believes that only when high schools truly push Tech Prep will it reach the desired scale policymakers would like to see.

Seattle Tech Prep Consortium

Community Overview

Increasingly, the Seattle region's economic base is becoming more diverse. Today, the Puget Sound labor and market area is a hub for Pacific Rim commerce and the center of just-emerging high tech enterprises. Area industries include high-tech front-runners Microsoft and Nintendo. Industries also include a range of health-care services, tourism and hospitality, electronics, and the production of goods as diverse as gourmet coffees and sports apparel. Tourism and hospitality jobs go begging because of the rapid growth of this job sector. The growing health-care area includes employment in medical research, various medical services, and biomedical equipment manufacturing. However, all local employers are still overshadowed by The Boeing Company. As orders for Boeing aircraft go up or down, so do jobs in Washington state. This airline manufacturer, the largest in the world, provides a ripple effect of 2.8 positions in the region for every direct position hired at the company.

The Seattle project area provides a major urban center model. The Seattle Tech Prep Consortium includes 10 high schools, three alternative high schools, three community colleges, and a vocational institute. The 13 high schools currently serve more than 11,369 students total, 7,525 of whom are enrolled in vocational and technical certificate programs. The Seattle Community College District enrolled 26,000 students during 1992-1993 and offers vocational-technical training in 34 program areas.

In the Seattle Public Schools, students speak more than 77 different languages and dialects. Kindergarten through 12th grade enrollment numbers 44,500 and includes Native American (3.2 percent), Asian (23.2 percent), African-American (23.5), Caucasian (43.3 percent), and Hispanic (6.7 percent) students. The fact that 56 percent of Seattle K-12 students are from traditional minority groups suggests one of the major issues facing the community. Many white families are moving to the suburbs or are beginning to send their children to private schools. An overall decrease in student enrollment brought on by birth rate changes also contributes. Seattle has needed to address a number of desegregation issues over the years; the district has recently introduced school choice within the district to help achieve more balanced student populations throughout the system.

Seattle's schools are feeling other changes. An increasing number of students do not live with both parents; many are latchkey children. Disproportionate numbers of minority students are living in low-income family situations and disproportionate numbers are unsuccessful in school—dropping out, getting suspended, doing poorly in academic subjects, entering the workforce with inadequate work and literacy skills, experiencing more pregnancy, more drugs, and more gangs—with few resources to help.

Seattle's three community college service areas vary considerably in racial and ethnic make-up. South Seattle Community College serves the lowest number of whites (54.7 percent), followed by Seattle Central (60.4 percent). North Seattle Community Colleges has by far the greatest proportion of white residents (nearly 88 percent), while Central has the largest proportion of African-American population served (19.9 percent). South Seattle Community College has the highest proportion of Asian residents (22.6 percent). The Native American Indian population is spread evenly among the three campuses in terms of proportional representation, while Central and South campuses serve greater shares of Hispanics.

Consortium Overview

The Seattle Community College District 6 with the Seattle Tech Prep Consortium is composed of representatives from North Seattle, Seattle Central, and South Seattle community colleges; 10 high schools in Seattle School District No. 1; eight businesses, an industrial association; and a labor union. The Seattle Tech Prep Consortium first met in July 1992. The governing board, which meets about every two months, consists of two local school district administrators and three administrators from the community colleges. The consortium has 13 working committees dealing with various aspects of Tech Prep. The consortium has a professional staff of two.

The purpose of the Seattle Tech Prep Consortium is to link the Seattle Community College District and Seattle Public School Tech Prep program with the business, industry, and labor communities to assure that Seattle students are prepared for careers that are rewarding, challenging, and supportive of the economic health of the community.

The Seattle Public Schools and Seattle Community College, one of the state's first models in articulated programs, have been operating Tech Prep-related programs for many years, beginning with a small planning grant in 1988 from the Washington State Board of Vocational Education. Since well before Tech Prep, a City Campus program of Seattle Public Schools has enabled students to enroll in late-afternoon vocational offerings at each of the three Seattle community colleges. A unique marine technology program is operated jointly by the two districts, and two other programs (cosmetology and collision repair) are contracted from the college district by the school district. The Seattle Consortium enjoys a particularly strong relationship to the private sector because of heavy involvement by The Boeing Company and support from other area business concerns.

Changes and Accomplishments Since Last Year

The image of Tech Prep is changing. Over the past year there has been a broadening of the concept of Tech Prep as a program for all students, not just those not planning to go on to college. This change has been influenced by the work done in school-to-work transition to get educators and others to see it as useful for all students. Teachers are starting to see Tech Prep as more than a program for slow learners.

Dr. Charles Kane, chancellor of the Seattle Community College District, and John Stanford, superintendent of Seattle Public Schools, have named Tech Prep and related school-to-work issues as a top priority for both systems.

A review of the Seattle Tech Prep Consortium structure led to the combining of the consortium committee and steering committee into a newly formed Tech Prep Council. The first meeting of the council was held on March 6, 1996.

Some teachers have done a lot of work developing curriculum units to address the MTAG competencies in manufacturing. Interest in MTAG among teachers has grown, especially at Chief Sealth, Ballard, and Ingraham high schools. Teachers are reviewing their curricula to see where there are gaps that can be filled with the new MTAG units. Four MTAG core competencies will be implemented in September 1996 at Ballard, Ingraham, Chief Sealth, and Rainier High Schools. The building teams have developed their modules/programs and have ordered tool kits for skill development. The modules/programs have been reviewed by the Tech Prep Advisory Council subcommittee and given their support for implementation. Next year North will add electronic and central wireless communications to the MTAG strand.

Discussions related to school-to-work transition have resulted in more communications and linkages among groups. The Tech Prep director has been appointed to the Seattle School-to-Work Advisory Committee. This assures Tech Prep will be a part of the total school-to-work system planning process. The Seattle School District has received two school-to-work grants, of which $39,000 will go toward the implementation of Tech Prep next year.

The Seattle School District has continued its development of career pathways at Ingraham, Rainier Beach, and Ballard high schools while other schools are planning to add new high tech fields. The consortium added a health occupations strand. A marketing program has been developed at South Seattle Community College. An additional strand linking work-based learning at Northwest Hospital with the Allied Health Programs at Central and North Seattle Community Colleges is being considered.

Collaboration is improving between the high schools and Seattle Community College. The community college high school advisors will be going into the high schools to describe the community college Tech Prep programs and the articulation process. They will be registering interested seniors and following up interested students each semester. There are also efforts to develop articulation agreements with four-year colleges. For example, the Academy of Finance is now working with Seattle Pacific University.

In order to increase internships next year the district will be hiring an MTAG coordinator to develop work-based learning activities for students. The coordinator will work with business/industry to develop internships, mentorships, educator interns, career days, and job shadowing positions, for students, teachers, and faculty. More students have done job shadowing and internships this year than in the past. Fluke Company has started a student internship program. Northwest Hospital and the Port of Seattle have become two excellent job sites.

Promising Practices

Three practices this year may be of interest to other districts across the country. The first is that of community college high school advisors going out to the high schools to discuss Tech Prep, the articulation process, and the Tech Prep programs the community college has to offer, and then registering interested seniors and following them up each quarter. This registration process should be in place next year. Students will be registered at the end of each semester and transcripted so they can receive advanced credits and be transitioned to the colleges.

A second practice is the hiring of a school-to-careers counselor by the school district to work with counselors across the district on Tech Prep and school-to-work transition and to visit each high school to find out what the school is doing related to school-to-careers. This information has been written up in several newsletters and shared among educators throughout the district.

A third promising practice is the Academy of Finance. The Academy of Finance as described by the district's school-to-career counselor in the December 1995 school-to-careers newsletter is "a program designed to prepare students to work in the financial field." The program provides students with the knowledge and experience necessary for career decisions as well as solid understanding of economic systems, financial markets, products, and institutions. The program is an interdisciplinary model between the social studies and business education departments in the high schools.

The Academy of Finance is housed at Franklin, Ballard, and Chief Sealth High Schools. It includes all three components of the school-to-work legislation. School-based learning includes:

- New curriculum developed by business and industry
- Industry experts assisting with curriculum delivery
- Curriculum being developed electronically via computer
- Stock market game
- Service learning projects

Work-based learning includes:

- Summer internships
- Mentoring/shadowing experiences

Connecting activities include:

- Annual career conference
- Field trips
- Student exchange

Tech Prep and School-to-Work Transition

Tech Prep is being viewed as a foundation for school-to-work transition. The articulation agreements with the community college and with several private colleges such as Seattle Pacific University are seen as contributions to school-to-work transition. Applied Mathematics teachers are working to integrate their curriculum with the Commission on Student Learning goals.

Partly as a result of Seattle Public Schools' success with Tech Prep the district was awarded a school-to-work local implementation grant from the U.S. Department of Education. The lead high school for school-to-work transition will be West Seattle High School which is a Tech Prep site. This school works closely with two business partners, Pacific Medical Center and Washington Mutual. It offers Principals of Technology, Applied Communications, and Applied Mathematics and has articulation agreements with Seattle Community College's Auto Technology Program.

Others ways that Tech Prep has supported school-to-work programs in Seattle Public Schools are identified in the district's school-to-work proposal. These include the staff development activities funded by Tech Prep, training in all aspects of the industry and in using SCANS skills and applications, use of career portfolios by all ninth graders, and the development and use of individual career and education plans.

Impact on Participating Students

Of seven students interviewed, all were able to discuss plans for continuing their education beyond high school. Two were planning to go to a four-year college and five to a community college. One student is already enrolled and taking an advanced drafting class at Shoreline Community College. The students reported that teacher advice and their internship experiences helped them focus on career interests. Students in an internship experience reported learning more about teamwork, adjusting to different surroundings, measurement, safety, and use of tools.

Strengths and Concerns

Strengths. In the Mathematica Policy Research, Inc. Inventory of Local Tech-Prep Implementation completed by the consortium director in December 1995, the following aspects of Tech Prep implementation were identified as most successful: collaboration between secondary and postsecondary educators, developing articulation agreements, obtaining support of business/industry and labor, building networks with other Tech Prep programs, developing increased awareness of Tech Prep in the educational community and public, integrating Tech Prep into larger reform efforts, support of career pathway models, and the development of core competencies in some curricula such as manufacturing. In interviews with the project director additional points were added as strengths. These included district funding to enable some teachers to spend three days in industry to learn what skills are needed and being used, the new Health cluster that was added, and the Boeing Company support for technical writing and student internships.

A business partner added that Tech Prep students are helping to bridge the gap between academic and vocational teachers and some students in the Boeing internship have started to ask classroom academic teachers for a process check when there are problems in the classroom.

Concerns. In the Mathematica Policy Research, Inc. Inventory of Local Tech-Prep Implementation completed by the consortium director in December 1995, the following obstacles to Tech Prep implementation were identified: negative attitude toward vocational education and/or Tech Prep, lack of definition of student participation in Tech Prep, lack of truly integrated curriculum, lack of involvement for Tech Prep among some local administrators, lack of collaboration between vocational and academic educators, lack of staff, time, and money dedicated to Tech Prep, classroom scheduling, conflicts with other reforms, lack of evaluation data, and lack of support from four-year institutions. Other points added in interviews included the lack of standards for work-based learning, the need for additional programs for special needs students, the need for ongoing teacher support, recruiting for students in the Boeing internship, and the concern among some teachers that Tech Prep is about to disappear. Students interviewed expressed a need for more hands-on activities and help in connecting classroom learning to the real world.

Twin County Tech Prep Consortium

Community Overview

The Twin County Tech Prep Consortium serves schools in Grays Harbor and Pacific counties, a rural region whose economy is heavily dependent on natural resources. The decline of forest-related jobs has led to a high unemployment rate with many displaced workers. Early this year, Governor Lowry declared Pacific County one of the economic disaster areas in the coastal region in Washington. The downsizing of the timber industry, regulations affecting offshore fishing, and a weakened agriculture base have all contributed to an increase in unemployment and a decrease in per capita income.

Facing the economic challenge, many people in this region are working to diversify the local economy. Tourism, shipping, agriculture, and boat building are some of the business segments picking up the slack, and the wood products industry is learning to squeeze more jobs out of less timber. With significantly lower commercial real estate prices and a shorter permitting process, this region is attractive to many prospective investors. The Great American Herb Co. with $5 million to $7 million in sales annually has recently constructed a building of its own in this region simply because of the lower price of land, the lower cost of building, and the shorter permitting process. Great American now employs 37 people full time and another 60 to handle Christmas orders. In February 1994, Best Western opened a $4 million, 76-room motel on the beach at Ocean Shores, which was followed by the opening of a new McDonald's restaurant. These are just a few of the many businesses recently establishing a presence in this region.

Historically, education has played an important role in this region; it is even more important now, at a time when high schools students can no longer move right into well-paying jobs in the woods and mills, and when former loggers and millworkers find themselves forced into education and training programs for new job opportunities. It is in this environment that the Twin County Tech Prep Consortium works diligently to prepare students for work or further education.

Consortium Overview

The Twin County Tech Prep Consortium, one of the pioneer Tech Prep consortia in Washington, was formed in 1992 with a three-year state Tech Prep planning and implementation grant. In 1995, the consortium received a Tech Prep administrative grant. In fall 1993, three consortium members—South Bend, Willapa Valley, and Raymond—were awarded as a group a separate three-year Tech Prep grant focusing on a Tri-District partnership in aquaculture. The consortium currently consists of 15 school districts, two community colleges, and 25 business and labor organizations. The school districts are Aberdeen, Elma, Hoquiam, Montesano, Nasselle-Grays River Valley, North Beach, Oakville, Ocosta, Quinalt, Raymond, South Bend, Taholah, Willapa Valley, Wishkah Valley, and Ocean Beach. The two colleges are Grays Harbor College and Centralia College. A full-time Tech Prep coordinator is housed at Grays Harbor College.

Over the past four years, the consortium worked closely with secondary schools, community colleges, businesses, and other community members toward the vision set in the early stage—that by the 1995-1996 academic year the consortium would support and maintain an environment in which every high school student has an individual planning portfolio and access to a sequential, articulated curriculum that motivates most students and provides them with skills in applied academics and an occupational cluster. The major elements of this vision are in place.

In the school year of 1995-96, all consortium schools have articulation agreements with Grays Harbor Colleges, 95 articulation agreements in total in the areas of information technology, industrial technology, natural resources technology, and human resources technology. The Twin County Tech Prep Consortium has selected five career paths for its high schools to use. The five career paths are industrial technology, business and marketing, health and human services, engineering and science, and arts and communications. Each career path consists of three levels: entry, skilled, and professional. Entry-level training takes place in high schools or vocational schools. Students who desire the skilled level need to go to technical college or community college. A four-year college or university education is required for those students who would like to be professionals in the area. Students are provided with examples of specific jobs at each level and students are encouraged to consult the Washington Occupational Information System (WOIS) for details of jobs listed for each level. No matter which career path students choose, they have to meet the graduation requirements defined by each school district. However, students vary in selecting their elective courses in accordance with the career paths they plan to pursue. School districts provide a list of recommended courses for each career path. The Standardized Individual Student Plan (ISP) Form developed through the consortium is now used by all consortium schools. The form allows students not only to choose one of the career paths suggested by the consortium but also those outside the suggested career paths.

Changes/Accomplishments Since Last Year

There were no drastic changes for Tech Prep in 1995-96. Most Tech Prep activities involved continuous program improvement or maintaining the Tech Prep system. However, noted below are some accomplishments of 1995-96 which will have a positive impact on the future of Tech Prep in the Twin County.

Aquaculture program. In 1990, the Tri-District, three small districts which make their high school classes available to each other, was chosen to pilot a National Council on Agriculture Education project to infuse aquaculture into the agriculture curriculum. Through successful development and implementation of the Aquaculture Program, funding has continued. The program was initially located in an 800-square-feet room in the vocational building of South Bend High School. In this extremely cramped and awkward facility students cared for their individual aquariums and attended to the production system. Partially supported with Tech Prep funding in 1993, the program moved to the Port of Willapa Harbor. Partnership with the Port allowed the Tri-District a low-cost lease for a 2,000-square-foot building at the dock. Students modified the interior to separate classroom, lab, and processing areas. Students also designed and installed a recirculating tilapia production system around two large circular tanks, 13.5 feet in diameter and four feet high. By the school year of 1995-96, all facilities in the program became functional. Two students who graduated from this program have been admitted to Grays Harbor College and found jobs in this area. One female student who always wanted to be an attorney attended this program and as a result, changed her career interest. She is now majoring in fishery science at University of Washington. This program is an excellent example of students learning academic and technical skills integrated with classroom, laboratory, and work-site activities as well as finding out about opportunities for employment in the natural resources pathway.

Block scheduling. Currently all Tri-District schools have the same block scheduling which includes an enrichment period at the end of the school day. Inservicing is planned to train instructors to use this enrichment period for career pathways exploration and planning activities.

Competency-based curriculum. Several Tech Prep programs in this region are competency based. nursing and automotive programs have computerized the competency tracking system. The competency-based curriculum for the welding program at Grays Harbor College meets the American Welding Society standards. A boat was build from scratch by welding students and was displayed at Northwest 1996 Tech Prep conference at Sea-Tac.

Tech Prep data management. The Tech Prep Management System developed by South Seattle Community College last year is now being used by some of the high schools in the Twin County Tech Prep Consortium. The system will enable the consortium to document Tech Prep students' demographic information, test scores, required competencies, and SCAN skills. Eventually, the system will allow the consortium to track all Tech Prep students and to improve the articulation process.

Promising Practices

The operation of Twin County Tech Prep Consortium over the past four years has produced some promising practices which may have a positive effect for Tech Prep as a program and school-to-work transition as a system in the future.

Block scheduling. Block scheduling allows an integrated curriculum to be taught in depth and gives teachers time for team planning. In the case of Tri-District, in which students from three districts take classes in each other's high schools, block scheduling has reduced the time students spend in transit from one school to another. Other benefits of block scheduling are that it allows extended time for labs; reduces classroom time spent on taking attendance and getting students to settle down; and encourages students, especially the college-bound, to take more vocational-technical classes and participate in Tech Prep because they can take more classes each semester.

Computerized competency tracking system and Tech Prep data management system. This system documents students' competencies and can also be used as a tool for instruction and assessment. The system will make the articulation process more effective in the future. It will also enable better management of Tech Prep and define Tech Prep students. Eventually, this system will be a useful tool for program assessment and improvement.

Collaboration between Tech Prep and School to Work. Tech Prep fits well under the school-to-work system. In the Twin County, Tech Prep and school to work have joined forces to prepare students for work or further education after high school. School-to-work transition makes it easier for Tech Prep to fit into the regular school system, whereas Tech Prep serves as an important means to achieve some school-to-work objectives.

Direct contact with local business/industry. Instead of contacting business/industry through intermediary organizations such as Chamber of Commerce, the Tech Prep coordinator has direct contact with local businesses and is able to communicate very clearly what assistance Tech Prep students need from them.

Standardized Individual Student Plan Form. This form makes it possible to include all consortium schools under one system flexible enough to serve not only students who choose consortium-selected career paths but also those students whose career interests go beyond what the consortium can offer. It is a very useful tool for showing students how they are doing in connecting the school to their future.

Tech Prep and School-to-Work Transition

Many Tech Prep and school-to-work activities are almost inseparable. In some cases, it is only funding resources that distinguishes Tech Prep from school-to-work transition. In the Twin County, there is strong collaboration between Tech Prep and school-to-work transition. People who work to implement school-to-work transition also serve as members of the Twin County Tech Prep Consortium. Personnel from each school district were instrumental in writing and procuring a three-year, Phase II Tech Prep grant beginning in the 1992-93 school year. The coordinator for the Tech Prep consortium serves as a member of the Tri-District General Advisory Council and Agriculture/Aquaculture Advisory Board as well as on many other general and program-specific advisory committees consortiumwide. He has also participated in and provided school-to-work inservicing opportunities since the program's inception, most recently as a member of the Tri-District team that attended the November 1995 Leadership Institute II for School-to-Career Transition/Education Reform in Olympia. He coauthored the school-to-work grant received by the Tri-District and provided valuable input and editing for five other school-to-work grant applications in the consortium, three of which have been awarded.

Teachers, counselors, and vocational directors feel that the best aspect of Tech Prep is the articulation between high schools and Grays Harbor College. The articulation has opened a formal channel for the communication between high schools and the community college and serves as an important vehicle to implement some school-to-work activities. The school and business/industry relationship that has been established through Tech Prep is equally beneficial and important to school-to-work transition.

Some Tech Prep products such as career pathways and career folders are now being incorporated into the school-to-work system. Applied academics, an essential part of Tech Prep, is also included in the school-to-work system. In addition to school to work, Tech Prep programs also work well with other programs or grants such as JTPA, SLIG, vocational education, and cooperative education in serving a diverse population of students. All school districts in this region applying for school-to-work grants include Tech Prep as part of their vision for their school-to-work system.

Impact on Participating Students

In response to a national evaluation of the Tech Prep education program conducted by Mathematica Policy Research, Inc., the coordinator of Twin County Tech Prep Consortium indicated that the following elements are required of all Tech Prep students in his consortium:

- Developing an individual student plan
- Choosing a broad career cluster or career major
- Choosing an occupational specialty area within the career cluster
- Taking or completing one or more applied academic courses
- Taking specialized articulated academic or occupational courses related to a career cluster
- Taking specified academic or occupational courses—whether articulated or not—related to a career cluster

Using the definition above, the coordinator estimated that in 1994-95 a total of 1,989 high schools students, or 54 percent of the total high school student population in the consortium, participated in Tech Prep. This estimate certainly indicates the scope of Tech Prep in this region. However, no data on the impact Tech Prep has had on these students are available from the consortium. To attribute outcomes resulting from the elements listed above only to Tech Prep is inappropriate because other programs such as school-to-work and vocational education have similar elements.

Some students the consortium considers as Tech Prep students were not aware that they were Tech Prep participants, even though they were very positive about all elements of the Tech Prep program when interviewed.

Strengths and Concerns

Strengths. In addition to the promising practices described above, the strengths of the Twin-County Tech Prep Consortium also lie in its wide base of 15 school districts and the high percentage of total student population involved in the Tech Prep program.

Concerns.

- **Sustainability.** Over the past four years, Tech Prep has become a large system involving many students and schools in this region. The full-time coordinator plays an important role in keeping this system running. With uncertainty about the future funding and commitment of each participating school district, how to sustain Tech Prep in the future is still a question.

- **Evaluation.** Lack of appropriate evaluation to show the impact that Tech Prep has had on its participating students may hinder its marketability in the future.

- **Some other barriers to the future of Tech Prep.** Listed below are other barriers to the future of Tech Prep indicated by the consortium director in response to the Mathematica Policy Research survey:

-Negative attitudes toward vocational education and/or Tech Prep
-Resistance of vocational educators to change at postsecondary level
-Resistance of secondary schools to replacing the general track
-Lack of definition of student participation in Tech Prep
-Lack of collaboration between vocational and academic educators at - postsecondary level
-Lack of staff, time, money dedicated to Tech Prep
-Lack of support/involvement of business and industry
-Lack of business and industry in the region
-Conflicts with other reform efforts for scarce recourses

Yakima Valley Tech Prep Consortium

Community Overview

Yakima County is located in southern Washington, east of the Cascade mountain range in a valley where agriculture is the primary economic resource. The school districts are small, rural, and isolated. Minorities represent about 60 percent of the student body with Hispanic migrant families accounting for most of this minority population. High teenage pregnancy rates persist.

Yakima County has some of the worst economic indicators in Washington state. Its unemployment rates are among the highest, and its residents have the lowest educational levels. Little economic development to create high wage and high tech jobs is occurring. Subsequently, the county generally lacks trained workers. However, there are several manufacturing operations in the area that require skilled workers.

Migrant farm workers are a large source of labor for the agricultural production of fruits, vegetables, wine grapes, and hops. However, Yakima also has 120 manufacturers employing more than 10 people and 171 employing between 20 and 30 people. There is some effort on the part of the business community to encourage the development of international business in the area. For example, the hops industry is attempting to establish marketing opportunities with Germany. Five firms are owned at least in part by foreign interests.

Consortium Overview

Some time ago the Boeing Company—the nation's largest aerospace corporation with 95,000 employees in Washington state—convened a company task force and met with education leaders in the state to determine how Boeing might assist schools prepare students for the workforce. An applied academics model was viewed as a means to assure a qualified workforce in Washington state. Boeing provided funding to schools to adopt one of the three applied academics models. The company also launched a parallel effort to connect high school and community college applied academics programs. The Yakima Valley Community College began to design new curriculum approaches with more than 20 high schools. The Yakima School District had spent time building relationships between area high schools and the skills center beginning in the mid-1980s. Several cooperative projects existed, such as reciprocal registration agreements between the skills center and local schools for cross-crediting on existing courses. It was in this context that the Tech Prep program was initiated and the consortium began its efforts to expand applied academics and the articulation model.

The Yakima Valley Tech Prep Consortium, formed in October 1992, includes the 11 school districts and a skills center in the Upper and Lower Yakima Valley. The Consortium also includes one community college, partners in business and industry, labor groups, and the Yakima Chamber of Commerce. The consortium has met once a month during the past year. It has five working committees: an executive steering committee, marketing/conference planning committee, career pathway planning committee, business/office technology committee, and manufacturing engineering technology committee.

The consortium represents school districts that are faced with addressing serious educational and social problems. The school dropout rate is high. State funding cuts have moved schools to retrench and restructure existing programs. It was noted by those interviewed that restructuring becomes difficult with limited resources to carry out such efforts. All those interviewed saw Tech Prep as a means of responding to needed educational reform and change processes within the education system. Furthermore, respondents felt that Tech Prep provides students with the opportunity to gain high level technical skills either for additional education or employment in the Yakima Valley or elsewhere.

Consortium members interviewed generally agree that Tech Prep is based on knowledge and application in order to provide a meaningful curriculum for students. In addition, consortium members felt that Tech Prep was a program that, for the first time, focused on those students who are not in the top 20 percent and college bound.

Concerns expressed in previous years continue to persist. Specifically, consortium members are concerned that Tech Prep will foster a tracking system of sorts, one track for college-bound and another for non-college bound students. It is felt that if this occurs, the program will not survive. Consortium members are also concerned about the association of Tech Prep and vocational education. Members believe that disassociating Tech Prep from traditional vocational education is beneficial. They believe that the general public as well as some members of the educational community view vocational education as a "remedial" program or one providing training to those with special learning needs. Tech Prep, it is felt, is a program for higher level students to gain highly technical skills.

Changes and Accomplishments During the Past Year

A new Tech Prep coordinator was hired 1995-96. Thirty-three percent of his time will be spent as Tech Prep coordinator and 67 percent in workforce training.

Partnership with Chamber of Commerce. Paul Killpatrick, Ph.D., Dean of Professional and Career Education at Yakima Valley Community College became aware of the chamber of commerce and Tech Prep partnership concept at the 1994 Work Now and in the Future Conference when he heard a presentation about the use of this approach in Stockton, CA. In fall 1995 this new component of the Tech Prep program was launched in the Yakima Valley Consortium. Through, Yakima Valley Community College, the consortium entered into a partnership with the chamber of commerce in Yakima. The consortium provided funds for the chamber to hire a business-partnership coordinator who reports to the consortium's executive committee and is under its supervision. A job description for the coordinator was included in the agreement.

The business-partnership coordinator developed a brochure to send to businesses regarding involvement in the Tech Prep program. Approximately 1,100 brochures were mailed, with 58 businesses expressing an interest in working with students as part of the Tech Prep program. The business-partnership coordinator contacted these businesses to secure their involvement in the program as a site for job shadowing, internship, mentorship, or educator training. As well, the coordinator went into the schools and made presentations to students about the different work-based learning opportunities available and their relationship to Tech Prep.

A concern on the part of the business community as well as the consortium was the issue of liability while students were at work-based learning sites. The business-partnership coordinator worked with the consortium members, the business community, and attorneys at YVCC to write a contract addressing this issue. While there is a positive feeling regarding the contract, those interviewed believe that the strength of the contract will not be known until a specific incident initiates a legal test of this document.

The business-partnership coordinator has devised a student application process for job shadowing and internship experiences. Job shadowing and internship experiences are described by the business-partnership coordinator and sent to the work-based learning coordinator in each of seven school districts plus YVCC. Students interested in specific experiences fill out an application and a Student Eligibility Form which are returned to the business-partnership coordinator. These forms are entered into a database the business-partnership coordinator maintains at the chamber of commerce. The business-partnership coordinator screens the student application materials for appropriateness to the work-based experience. Those students found appropriate to a particular experience are asked to interview with the business. Selections are made for student participation based on the interview process.

Promising Practices

Partnership with the Yakima Valley Tech Prep Consortium and the Chamber of Commerce. A promising practice that has emerged from the Yakima Valley Tech Prep Consortium is the partnership that has developed with the Yakima Chamber of Commerce. This model allows for the active participation and involvement of the business community via the chamber of commerce as well as educators. This model has been previously described in this report.

While this model holds promise for a strong business-education partnership, it is not without areas of concern. Specifically, there is a need for active involvement on the part of the Tech Prep consortium to be part of the hiring process for the business-partnership coordinator. Since Tech Prep funds are used to support this position, it is necessary that consortium representatives be on the hiring committee.. Consortium members interviewed said they were very concerned about whether the chamber would be able to get the right person for the job.

It was said by some consortium members that the reason this model is so successful is that "education is out of it and there is a business person involved [as the business-partnership coordinator]." It was felt that teacher time was now "freed up" by having a business person involved in the Tech Prep program. While this may be true, the voice of education may be lost in such a model. It must also be remembered that Tech Prep is a partnership between business and education in which students receive technical preparation in one or more specific occupational fields and build their competency in math, science, and communications through a sequential course of study leading to an associate degree, two-year certificate, or two or more years of apprenticeship training.

Tech Prep and School-to-Work Transition

Identity of Tech Prep and School-To-Work Programs. Consortium members are concerned that with the development of school-to-work programs, Tech Prep will not remain a separate and distinct program with its own identity and that the goals of the two programs will be confused by the general population and business community. Consortium members interviewed were confused regarding whether Tech Prep and school-to-work programs served the same or different populations. Some said that Tech Prep and school-to-work programs served the same population of students in that all students had access to both programs. Others felt that the two programs served very different populations. School-to-work transition is required to serve all students regardless of ability or interest and is seen as general workforce education. Tech Prep is seen as a technical program designed to serve high-level students who want to gain highly technical skills in a specific career pathway.

Some say that because the chamber of commerce is affiliated with the Tech Prep program it has higher standards and they worry that Tech Prep could lose its identity under school-to-work by lowering its standards. Specifically, if, under school-to-work transition, a competency-based system is not implemented at the high school level, students may not be ready to enroll in articulated programs at the community college.

The message of school-to-work transition as described by those interviewed was limited to high school and did not include a long-range focus of career planning beyond the high school level. All of those interviewed said that Tech Prep was one component of an overall school-to-work program and needed to maintain its own identity and goals. One administrator described school-to-work programs as developing a dream to understand where a student can go and the roadmap to get there, while Tech Prep programs provide students a route to the world of work by building a relationship with a community college through articulation agreements.

There is little collaboration with school-to-work projects in the lower valley. Wapato High School has been one of the national funded sites for school-to-work and has many of the Tech Prep components in place. The school-to-work project is coordinated by the Private Industry Council but operated in the high school. Students at Wapato choose a career pathway, compile and present portfolios, and participate in at least one job shadow in their pathway. Staff members are trained on SCANS skills and how they apply to all courses, and several articulation agreements have been developed with the local community college. Wapato is a good model of school-to-work transition, but no collaboration is occurring between this school-to-work program and Tech Prep. Turf issues between the two projects are apparent, especially since the chamber effort did not include the lower valley schools. The consortium is missing an opportunity to share ideas and discuss issues and to have the chamber become involved in school-to-work.

Competition for Work Experience Sites. Competition is keen among the various programs for access to the business community for work experience sites. In addition to school-to-work, schools in the Yakima Valley Tech Prep Consortium have other programs (community service with local business as a graduation requirement, for example) that are competing with area businesses for student work experiences. When consortium members were asked how it was decided what businesses would work with a particular program or programs, members said that it depended on which person or program got to a business first. At least one employer voiced concern about this process to one of the consortium members recently in a letter asking for a more coordinated approach between those approaching business for work experience sites.

Integration with Other Educational Reform Efforts. Tech Prep was cited as being highly compatible with other educational reform efforts underway in Washington. The reason consortium members believe Tech Prep fits well with other reform efforts is that this program is competency-based. The competencies identified in the Essential Learnings can be pulled out from applied academics courses. Consortium members feel Tech Prep and applied academics will become models for the competencies identified in the Essential Learnings. They also say that teaching models and methods used in Tech Prep will be the models used in educational reform efforts, since they are both competency-based as well as focused on application of knowledge.

Impact on Participating Students

As of the spring semester of 1996, 147 students were placed in job shadow or internship experiences. Approximately 160 businesses are now participating in the project and have agreed to provide worksite activities for students. The business-partnership coordinator visited classrooms in the upper valley area (including high schools in West Valley, East Valley, Selah, Highland, and Natches) to describe the project to students and to solicit the assistance of school staff in getting the word out. Job shadows at local businesses lasted from two to three hours to half a day for each student. Businesses can dictate which students can participate. Their decisions are based on criteria such as appropriate dress, academic abilities, and educational levels.

Public awareness of the Yakima Valley Tech Prep Consortium was cited as a limitation of this program. Consortium members interviewed said the lack of awareness on the part of the general public, business community, parents, students, and educators was of concern and limited the accomplishments and, thereby, the impact of Tech Prep in Yakima. Consortium members who were interviewed said the message about Tech Prep was not getting out to parents and students. Some said the Tech Prep message was not "filtering down" to students from teachers, counselors, and work-based learning coordinators. A goal of the consortium is to break the barriers down with parents regarding the stereotypes associated with Tech Prep. In addition, getting the message to individual teachers was seen as problematic. It was felt that barriers with teachers would be "broken down" shortly, although how this was going to occur was not specified. Consortium members said there was still a feeling among most parents, as well as others including some teachers, that a baccalaureate degree was the ideal and anything less than this, including a degree from a community or technical college, was inferior regardless of employment or earning potential.

The direct impact Tech Prep is having on students could not be articulated by those interviewed. It is felt that the program, specifically the chamber of commerce model, is too new to be able to ascertain any kind of impact or effect on program participants. In addition, the first school-to-work class was only offered at the high school level in spring quarter 1996. The Yakima Valley Community College has not yet received any applications for admission from students involved in a high school Tech Prep program. Consortium members believe that as more students become involved in the Tech Prep program and positive awareness increases among students, parents, educators, the business community, and the general public, enrollment will increase, as well as the ability to identify the impact of the program on participants. Those interviewed feel that the Tech Prep program has the potential to have a great impact on a large number of students. One consortium member said that because of the involvement of businesses with the Tech Prep program, a lot of training can occur that students cannot access within the walls of a traditional high school.

Strengths and Concerns

Strengths.

- Development of the chamber of commerce - consortium partnership model
- Strong involvement of business, industry, and labor
- Involvement of the business partnership coordinator in the schools

Concerns.

- Consortium members feel it is important that students placed in work-based learning represent the program well. The consortium needs to decide whether students should be required to have taken part in applied academics courses or be involved in an articulated course of study in order to be placed in an internship experience, for example.

- Career pathways have been developed and a career awareness and counseling process developed as well. It was reported by consortium members and students that this process is piecemeal at best. Students were unable to articulate points at which they received career information and reported that career counseling was nearly nonexistent. High school seniors appeared to be given some information and counseling, but as one student pointed out, this comes too late because a senior cannot go back and take needed classes for a particular career or program at this point.

Columbia Basin Tech Prep Consortium

Community Overview

Situated in southeast Washington, the service area of the Columbia Basin Tech Prep Consortium is noted for its rolling hills towering above the Columbia, Yakima, and Snake Rivers. Richland, Pasco, and Kennewick form a group of cities usually referred to as Tri-Cities. While agribusiness is the cornerstone of the Tri-Cities' economy, the area's primary employer continues to be the Hanford Nuclear Reservation, an outgrowth of the Manhattan Project carved out of the Eastern Washington desert. For about 40 years, Hanford produced plutonium, which is a vital ingredient in atomic and hydrogen bombs. At its prime, Hanford employed 50,000 workers. With the end of the Cold War, the size of the workforce at Hanford has been reduced to about 14,000. However, Hanford still provides about 25 percent of all Tri-Cities jobs, and produces about 40 percent of worker income. The production of plutonium at Hanford has also produced a troublesome brew of radioactive chemicals. Some of it was stored in million-gallon tanks, some was dumped into the soil.

Today, the federal government has committed to cleaning up the mess, in an effort that will last 40 to 50 years and certainly ensure a solid employment base. For better or for worse, Hanford is a blessing to the local economy.

Also located in the Tri-City area is Pacific Northwest National Laboratory (PNNL), a home base for hundreds of scientists and technicians who are leading in the areas of energy-related research, material science, environmental restoration, robotics, and hazardous waste management.

Although dominated by agribusiness, the Tri-Cities have a high concentration of high tech people because of Hanford and PNNL. Many of their talents and skills transfer easily to other industries. For example, people who used to design and calibrate instruments for a nuclear reactor can do the same for a semiconductor plant.

With diverse agribusiness and the huge environmental restoration effort sponsored by the federal government, Tri-Cities is still a promised land where the sun shines 300 days a year. However, to maintain prosperity, schools in this area must prepare the technical workforce of today and tomorrow, which is the mission of Columbia Basin Tech Prep Consortium.

Consortium Overview

The Columbia Basin Tech Prep Consortium received its first planning grant in 1992-93 from Phase II Tech Prep funding in Washington state and its first implementation grant in 1993-94 Phase III Tech Prep funding. Coordinated through Columbia Basin College (CBC), the consortium serves eight school districts (Richland, Kennewick, Pasco, Colbur, Finley, Franklin, Kiona-Benton, and Prosser) and one skills center (Tri-Tech Skill Center).

Changes and Accomplishments Since Last Year

As is true with other Tech Prep programs across the country, articulation between a community college and high schools in the service area of that college is a key component of Tech Prep in the Columbia basin area. Since its inception, the consortium has chosen to target six programs for articulation: Welding Technology, Automotive Technology, Business Education/Office Technology, Environmental Restoration Technology, Early Childhood Education, and Food and Fiber Processing, each of which is discussed below. The choice of the six programs was determined by local availability of jobs in these areas as well as the maturity of these programs at the local college and consortium high schools. In addition to the articulation, the consortium has also worked on a number of special projects in collaboration with different high schools. These special projects include Competency Tracking System, Clearinghouse, Material Science Technology and English, World of Work Career Fair (WOW), Eastern Washington Automotive Cooperative Internship, and Office Technology Shadowing, as well as implementation of applied academic courses in four high schools. The consortium also sponsors various inservice activities for hundreds of teachers, counselors, administrators, and business and industry representatives.

Welding Technology. Columbia Basin College and Tri-Tech Skill Center have signed an articulation agreement that allows high school students to earn a maximum of 29 college credits at Tri-Tech. Tri-Tech is located within the Kennewick School District and serves students from more than 10 high schools in the area. It was founded in 1976 to meet students' needs for technical programs that, because of expense, cannot be run by a single school. Tri-Tech has been successful in combining resources from different schools in serving not only regular high school students, but also dropouts. A survey of those who completed various programs at Tri-Tech in 1992 showed that of 96 percent who responded, 59 percent were employed, 35 percent were attending college, and 2 percent were in military service. A variety of programs are now offered at Tri-Tech: Computer Graphics and Printing Technology, Marketing on the Mall, Catering and Restaurant Management, Radio Television Production, Cosmetology, Early Childhood Education, Medical and Dental Office Careers, Nursing Assistant Certified Medical Careers, Auto Body Technology, Teen Parent Education, Auto Systems Technology, Carpentry, Diesel and Heavy Equipment Mechanics, Electronics Technology, and Environmental Restoration.

The Tech Prep consortium is planning to extend the current articulation beyond CBC and local high schools to other colleges and universities. For example, Dr. Richard Richardson, Associate Professor of Welding Engineering, Ohio State University, spoke to CBC about the possibility of forming an "informal" articulation agreement on Welding Engineering. The Tech Prep consortium is actively pursuing this option to complete the 2+2+2 sequence for the welding students.

With Tech Prep funding, CBC started a new integrated course, Material Science Technology and English in winter 1996. This interdisciplinary program taught by a team of three teachers combines the principles of physics and chemistry in a practical engineering approach focused on selecting appropriate materials for existing applications or to inventing entirely new materials to meet the needs of today and tomorrow. English is taught whenever writing skills are required in the program. Students are introduced to the elements of composition and revision, document design, and effective sentence construction, and word choice.

Students interviewed in the program have been energized by the integrated approach of instruction. Students from the Tri-Tech felt the welding courses they took at the secondary level have prepared them well for the advanced level at the college. In fall 1995, 12 welding students from Tri-Tech registered at Columbia Basin College. Their credits, ranging from nine to 21, have been recognized by CBC. One middle-aged female student told us that she had been out of work for a while but was confident she would find a job after completing the program. She also commented that English used to be a class she disliked intensely. She had difficulties with terms such as "transitional signals," "compound sentence," and "complex sentence." Now, with the immediate application of grammar rules to the writing of various reports for this program, she is fascinated by the manipulation of English for effective written communication. Many students in the class echoed her point of view. One instructor in the program proudly told us that the welding program has had almost 100 percent job placement for its graduates and demand for such students is still high.

Automotive Technology. The consortium received funding in 1994-95 to link various Automotive Technology programs offered at different consortium high schools and CBC. Currently, the project is being implemented and is near completion. During the first year of funding, the consortium focused on creating a system that will link Automotive Technology programs offered at both secondary and postsecondary levels. A team of high school teachers and CBC faculty members have examined all Automotive Technology programs in the area and also looked at model programs elsewhere. Team members identified missing components in the existing area programs. These components include a common language, a way to track competencies, a way to handle paperwork to ensure accuracy, accountability, common testing criteria, and articulation. The consortium received funding to link the three existing high school automotive programs with the community college program so students can exit the high school program with the skills needed to ASE certify in two areas and continue their program of study to ASE certify in at least two more areas upon graduating with an AAS degree. The instructors agreed to use the National Skill Standards as defined by the automotive industry (NATEF). All syllabi, course outlines, lab exercises, and work-based learning experiences are directly tied to the NATEF task lists. Since all instructors are using the national standards, establishing a common language, criteria, and accountability is not a problem.

The instructors also use a common data test bank (Q-bank) for testing their students. The Q-bank is housed at CBC and accessed electronically by the high schools. With feedback from high school teachers and community college staff, a databank containing over 2,000 testing questions relating to automotive technology is now in place. Both high school teachers and college instructors have access to these questions and use them at their individual schools. This question bank allows teachers flexibility and efficiency in writing their own tests. In the meantime, students are tested in consistency with the NATEF standards.

In addition to the question bank, a computer management system is now being pilot tested in the Automotive Technology program at CBC. The instructors loaded the NATEF competencies and tasks into the computer management system. It tracks competencies earned in the classroom and lab, and through testing and work-based learning experiences. It provides the necessary components for a comprehensive portfolio which the students can use as they search for jobs. The system can be used as an effective tool for instruction, testing, and documenting each student's competency level. One instructor in the program said that the system finally allows a common language to be used between high school teachers and college instructors and will make articulation of courses at secondary and postsecondary levels much easier. The system has great potential to be used in the other areas.

Business Education/Office Technology. In 1994-95, three small rural schools (Columbia-Burbank, River View, and Prosser) and two large schools (Kamiakin and Pasco) were targeted for implementing a Business Education/Office Technology Tech Prep program. After an areawide business education advisory committee was formed, 17 teachers representing 10 high schools from eight school districts and four community college instructors decided to develop the articulation agreement. They reviewed relevant materials gathered from Washington, Oregon, and Idaho. These materials contain information relating to competencies, competency tracking systems, portfolios, individual student plans, articulation agreements, and program promotion.

After extensive review of various model Business Education programs through reading, workshops, and conferences, participating high school teachers, in collaboration with college instructors, have developed a list of competencies to use for the Business Education program in the consortium area. Six courses at CBC have been identified and targeted for articulation and various similar courses offered at 10 high schools have been aligned with the six Office Technology courses offered at CBC. In the articulation agreement developed between CBC and the high schools, CBC advanced placement requirements, conditions, and procedures are specified. High school students wishing to take advantage of these articulated courses are required to sign a form to declare their interest in the Tech Prep Business Education/Office Technology Articulation Program and agree to meet certain requirements (for example, maintain a 3.0 or better in the designated high school classes). Students from this program will be arriving on campus fall 1996.

Environmental Restoration. The Columbia Basin Tech Prep Consortium is currently developing an Environmental Restoration Technology Tech Prep program. The program, housed at Tri-Tech, will be open to juniors and seniors. Students in the program will attend home schools for supporting academic and technical courses through their junior year. They will then attend Tri-Tech for three consecutive class periods a day, 540 hours per year. Upon completion of the program at the secondary level, they will graduate and articulate to CBC's Environmental Restoration Management Technology (ERMT) program with advanced placement credit toward an associate degree. The scope of the program will be broad enough so that students will not be tied to the Tri-City area for employment. ERMT offers students the opportunity to enter the workforce directly or further their education. A coordinator funded by Tech Prep money coordinates the development of the high school Environmental Restoration program with Columbia Basin College and the Hanford site contractor representatives.

Given the large-scale federally sponsored clean-up efforts in the Tri-City area, the program in development has received great support from local business as well as federal agencies. Contacted through the educational gift program administered by Westinghouse Hanford, the Department of Energy has donated large numbers of computers and other equipment.

Early Childhood Education. The Columbia Basin Tech Prep Consortium is currently in the process of developing an Early Childhood Education articulation agreement between Tri-Tech Skills Center and Columbia Basin College. The program will be open to juniors and seniors. Students will attend home schools for supporting academic and technical courses through their junior year. They will then attend Tri-Tech for three consecutive class periods a day, 540 hours. Upon completion of the program at the secondary level, they will graduate and articulate to CBC's Early Childhood Education program with advanced placement credit toward an associate degree. Students in this career path may choose to enter the workforce directly after completing the associate degree or continue to a four-year institution in pursuit of a teaching degree. The first group of students will be on CBC's campus fall 1997.

Food and Fiber Processing. The Columbia Basin Tech Prep Consortium is currently in the process of developing a Food and Fiber Processing program. The partners include Pasco High School, Columbia Basin College, WSU Tri-Cities, and regional food and fiber processing companies. This program is designed to fit into the Agricultural and Natural Resources career pathway. The goal is to create a seamless education/work experience program for students pursuing the industry and the levels of education required. A DATA DACUM has been done to affirm the skills and competencies required; high school and college instructors are currently aligning and designing curriculum to meet industry needs, requirements, and standards. Each school plans to pilot components of the program starting fall 1996. The program will be expanded to include other consortium schools as appropriate. Future work includes the establishment of workplace experience opportunities for students and shadow experiences for instructors.

Promising Practices

A promising practice of the consortium is the funding structure for the clearinghouse for school-to-work opportunities (discussed below in the Tech Prep and School-to-Work Transition section). Funding is shared between Tech Prep and school-to-work and the clearinghouse will eventually be sustained by the schools that use it. Such a structure means the practice will not disappear once initial funds are expended.

Another promising practice is the use of computers to track competencies in the automotive program at Columbia Basin College (discussed above in the Changes and Accomplishments section.)

Tech Prep and School-to-Work Transition

Tech Prep shares many elements with other education reform programs in this area, such as vocational cooperative education, JTPA, and school-to-work programs. These common elements include the following:

- Career awareness, exploration, and counseling
- Integration of academic and vocational instruction
- Credentials and certificates for academic and occupational skills
- Multiple learning strategies for students
- Links between secondary and postsecondary education and training programs
- Competency-based curriculum
- Work and school-based learning opportunities

Because of these shared common elements, many Tech Prep activities overlap those of other programs. In an effort to streamline activities and avoid duplication, the area educators are working to establish an oversite committee or governing board. However, Tech Prep can stand alone in many other aspects. For example, the articulation process has institutionalized the linkage between secondary and postsecondary schools. Despite differences and similarities, Tech Prep and other programs mentioned above fit well with the emerging web of school-to-work activities.

Numerous highly successful school-to-career programs have been in place in the Tri-City area for more than 25 years. To facilitate the coordination of a regional school-to-career system, the Tri-City Area Vocational Cooperative is planning a governing board to include representatives from the following groups: Tri-City Area Vocational Cooperative, Tri-Tech Skills Center, postsecondary institutions (CBC and WSU Tri-Cities), the Tech Prep Consortium, the Private Industry Council, area business and labor, chambers of commerce, service organizations, Department of Labor and Industries, and community-based organizations. The region envisions a governing board whose primary focus will be to consolidate existing school-to-career initiative boards and committees. This board will have the responsibility of advising on the management of grant funds as well as pursuing additional sources of revenue.

The Tri-City area has a long history of career education, dating back to the 1970s. Some of the supporters of career education are now active advocates at the state level for the school-to-work initiative. Community support for preparing students for the world of work has always been strong in this area. Collaboration between different programs with similar missions and objectives seems very natural. Close personal relationships between different program directors also makes such collaboration possible. Collaboration is also facilitated by support from district superintendents. Now educators and community members are thinking about forming a consortium (Middle Columbia Consortium) to link and coordinate all major school-to-work activities in the area. Doing so will relieve some community members from serving on multiple advisory committees for similar purposes. A concerted effort will stimulate systemic reforms in the educational institutions and ensure certain vital programs will continue when external funding is over.

Realizing the internal linkage between Tech Prep and other programs, educators, business, and community members are collaborating to organize activities that benefit all students. Clearinghouse and World of Work Career Fair are two examples of such collaboration.

Clearinghouse. The clearinghouse concept comes from the needs of schools and various programs within the web of school-to-work activities for career information and work-based experiences. The clearinghouse is intended to serve as a "one-stop shopping center" for expanding the walls of the classroom or to serve as "a single point of contact" to the world of work. Business people often feel overburdened by multiple phone calls from various schools and programs looking for workplace experiences for their students. Educators and program coordinators often spent hours trying to locate the right workplaces for their students. With the clearinghouse now in place, one phone call takes care of all. Educators simply specify their needs and the clearinghouse coordinator will make the arrangements with business to meet their needs. Currently, the clearinghouse has over 300 business, labor, government, and community-based organizations providing school-to-work opportunities in the areas: cooperative education, inquiries into science, job shadowing, mentorships, guest speakers, work experiences, internship experiences, field trips, career fairs, and community experiences. The clearinghouse is housed in Hanford High School, but is electronically accessible to all area middle and high schools. The database is updated quarterly. Eventually, the clearinghouse database will be institutionalized in all secondary schools in the area, Columbia Basin College, and WSU Tri-Cities.

The clearinghouse is currently funded with a school-to-work grant and Tech Prep money. Schools that use the database are willing to share the cost of operating the clearinghouse when the initial funding is over. Teachers who use the clearinghouse say it still cannot respond at a speed desired by individual schools. However, teachers like the concept; with the planning and increased experience of the coordinators, these teachers are confident the clearinghouse will work well.

The World of Work Career Fair. The World of Work (WOW!) Career Fair started in 1994 and funding for this annual summer event comes from Tech Prep, school-to-work transition, and Carl Perkins money. Last year, this event attracted hundreds of business, industry, labor, and education representatives and served approximately 4,200 students. During this event, business and industry representatives have hands-on displays and are prepared to speak with students about the world of work, hot career fields, and the amount of education/training required to be successful in a particular field. This event provides students with a unique opportunity to explore various careers and dispels misperceptions of limitations based on gender, race, and disabilities. Many teachers have taken advantage of this event to establish initial contact with business and industry people for further career exploration. Some students told us that WOW! is organized like a festival and it is fun to participate. "Our fear of communicating with adults about future careers is gone when we are there," one student summarized.

Putting such an annual event together involves the collaborative efforts of teachers of different school districts, parents, students, business/industry people, and other community members. It has increased not only students' career awareness, but that of all participants. The 1996 fair served 4,100 students from 23 middle and high schools; more than 100 business, industry, and education representatives participated.

Impact on Participating Students

Because Tech Prep is still in its early stages in the Tri-City area, it is too early to assess its impact on participating students. However, to obtain feedback on the program from participating students, students from a Cooperative Office Education (COE) class at Kamiakin High School were interviewed. COE serves as the work-based component of the high school Business Education Tech Prep program.

Fifteen students were interviewed about their experiences with career and work-based learning. One student planned to join the Air Force. Of the 14 remaining students, most (10) plan to attend the local community college for two years and then move on to a four-year university to complete their degree. Thirteen students reported that these future plans were developed with the support of their parents and other family members. The remaining two students reported no assistance.

Twelve students said they had taken career-related courses. Ten of them had taken four or more career-related courses. Commonly listed courses were keyboarding, COE, and Business English. All 15 students reported some community/business experiences. Several students appeared to have initiated these experiences because of their involvement with the COE class.

Thirteen students reported that all or some of these community/business experiences were related to what they were learning in school. Of these, seven specifically tied the experience to the COE class in their response. Two students reported no relationship between work-based activities and school. Most students interviewed reported that school and workplace have totally different atmospheres.

Although different students learned different skills from their work-based learning experiences, there were several common experiences. Nearly all of the students described improvement in their interpersonal skills. These included improved communication skills, listening skills, and the ability to work with diverse individuals. Students also reported improved time and task management skills, a more complete understanding of office procedures and professionalism, and enhanced computer knowledge and skills. Finally, several students felt they were able to manage stress more effectively because of their work experiences.

Most of the interviewees felt that the school did a good job in preparing them for college and/or careers. As for the perceived weaknesses of their high school experience, four students reported that they did not perceive any weaknesses; seven students listed their lack of ability to make choices as a weakness. These responses included comments such as "I take on too much," " I didn't join all the clubs that I had hoped to because of conflicting time schedules," and "Teachers would sometimes let us slide and I took advantage of that." One student responded that there seemed to be a general laziness among students and teachers, and another expressed dissatisfaction with the school's career center. This student reported a lack of assistance in making future plans, and applying for colleges and scholarships.

In response to the question of whether the school could do a better job to help students focus on their career interests, the interviewees made the following suggestions for the school:

- Offer more focused courses
- Publicize the career center more
- Offer more job-shadowing experiences and get more business/industry involvement
- Offer the Business and Technology program to more students and use this program as a model to create programs for other careers
- Offer career interest tests to juniors and seniors

The interview results from this sample of students clearly show that most students plan to pursue further education after high school. They welcomed the idea of connecting school to work and believed such connection was important for planning their future careers. It is clear from the students' comments that the school needs to do more to prepare students for postsecondary education as well as for careers. Even though COE is part of the Tech Prep program, none of the interviewees gave any comments regarding Tech Prep. It is questionable whether this group of students understands what Tech Prep is for and how this class is related to Tech Prep.

Strengths and Concerns

Strengths. In the Tri-City area, Tech Prep has played a significant role in preparing students for work and for further education. The articulation process has made it possible for various high schools to align their programs to those offered at Columbia Basin College. The focus on the competencies in these program has allowed teachers at the secondary and postsecondary levels to communicate with each other in a common language. In the case of Tri-Tech, where many technical programs are offered, Tech Prep is a natural path for students there to pursue. In the emerging web of school-to-work activities in this area. Tech Prep is an important vehicle to translate students' career plans into a reality.

Concerns. Although Tech Prep is designed as a program to help students move from high school to a postsecondary institution with a clear focus on their career interest, Tech Prep students in this area are largely defined as students who take the articulated courses. Some of the students simply view these courses as "electives," credits of which will be recognized at CBC. They are not totally aware of the benefits these courses as part of Tech Prep can offer them in fulfilling their career plans. In other words, these students look at Tech Prep as isolated articulated courses rather than a comprehensive program. Some teachers and administrators interviewed seemed to have the same level of understanding of Tech Prep. Efforts should be made to increase student, parent, community, and educator awareness and understanding of the benefits and comprehensive programmatic structure of Tech Prep.

Additional issues that are not uncommon to Tech Prep or any educational reform movement are lack of time for teachers to work together; lack of clear understanding and support from administrators, other teachers, and parents; the "vocational" stigma; the fear of change; and the perception that the only road to success is through a four-year college degree and that a technical/vocational degrees is somehow not as good.

South King County Tech Prep Consortium

Community Overview

The South King County Consortium (SKCC) geographic area begins at the southern Seattle city limit, extends south to the Pierce County line and includes the Sumner District. It is bordered on the north by Issaquah, on the east by Enumclaw, and on the west by Puget Sound. The school-to-work proposal for the area describes it this way:

> The region is employer rich, with the majority of the employers located throughout the Kent Valley and along the I-5 corridor. The regional demographics are diverse, comprising blue-collar, middle-class, and high poverty populations. Several of the individual members represent isolated areas such as Vashon Island, which is only accessible by ferry. The population is 585,009 as determined by the 1990 census."

Consortium Overview

The SKCC is a partnership of Green River Community College, Highline Community College, Renton Technical College, Auburn, Enumclaw, Federal Way, Highline, Issaquah, Kent, Renton, Sumner, Tahoma, and Vashon Island school districts, Central Washington University, the King County Labor Council, The Boeing Company, Heath Tecna, US WEST, Communications Workers of America, IAM CARES, Seattle/King County Private Industry Council, Southwest King County Chamber of Commerce, student representatives, Region 9 Parent and Student Association, and numerous other employers, labor organizations, and community organizations. The SKCC was chartered as the South King County Tech Prep Consortium in 1991. It has written and obtained funding from other grants including the Local Partnerships in School to Work.

Changes and Accomplishments Since Last Year

In the past year or two, changes have occurred at the high school, community college, and consortium levels. At the high school level educators are starting to reach a broader range of students beyond the middle quartiles to include both high- and low-achieving students. Students have more work-based learning opportunities to choose from and more career information available. Career paths have been added by more districts, especially Auburn. The consortium has expanded into school-to-work transition, thereby affecting a larger percentage of students.

Green River Community College is becoming more active in changing its vocational curriculum to match new demands by industry. The college has also updated some of the articulation agreements with the high schools. Some community college staff are moving more toward applied academics even in advanced mathematics areas such as calculus.

At the consortium level networking among educators and business and industry is increasing and the Tech Prep reputation is growing. Teachers and business people are starting to ask how they can get involved with Tech Prep.

Promising Practices

Perhaps the promising practice from this consortium that has received the greatest degree of interest across the United States and parts of Canada is the Workplace Applications Project. This South King County Tech Prep Consortium project supported the consortium's efforts to link the classroom to the world of work by providing teachers with examples of applications to use in developing classroom exercises, planning curricula, and adding relevance to classroom instruction. During summer 1995, the Workplace Applications Project sent out 24 teachers in six four-person teams to visit 48 local employers. The six teams had a mix of secondary and postsecondary educators in academic and vocational subject areas. In addition to participating teachers who were organized by career pathways, the project also involved a career information specialist and a third-year student from Central Washington University who did student teaching during the 1995-96 school year.

In addition to funding received for this project from the State Board for Community and Technical Colleges, the project received $4,600 from the regional office of the U.S. Department of Labor to assist with replication and dissemination.

As a result of a 1996 School-to-Work local partnership award from the U.S. Department of Education, the Consortium will be training 180 educators this summer including teachers at the K-12 level, a principal, and a school board member. As a result of the positive effects of the Workplace Applications Project last summer, some school districts in the consortium have chosen to use their local funds to send additional teachers beyond what their STW allotment would have provided. An example of this is Summer High School which sent nine academic and vocational education teachers to participate in last summer's Workplace Applications Project and will send another 10 this summer. (A separate evaluation report has been prepared regarding the Workplace Applications Project, Owens, 1996).

The Workplace Applications Project helped accomplish four goals of the Tech Prep Consortium: (1) better involvement with business and industry, (2) staff development, (3) linking school- and work-based learning, and (4) improved academic and vocational learning.

1. **Better involvement with business and industry.** The project contributed to more active involvement with business and industry by making contacts with local businesses and government agencies that had no experience working with educators. It also strengthened links with already involved businesses by giving them a clear and meaningful role to play in educating teachers on the realities of the workplace. Teachers reported that their business contacts enjoyed having teachers visit their workplaces to learn what they were doing and the skills needed by their workers.

2. **Staff development.** The project introduced an experiential approach to staff development that has made a significant difference in the lives of many of these teachers

During the summer reporting session in which teachers shared what they had learned, it was clear that the project created not only new knowledge and the motivation to share that knowledge with students, but that it also became a rejuvenating experience, especially for some of the more experienced teachers who found it presented opportunities to teach applications in ways new to them and to create relevance for student learning.

This was also a rewarding experience for the third-year college student from Central Washington University, who learned about the workplace, new vocational technical terminology in education, and how to relate the workplace to the classroom. Her 13 lesson plans included ways high school students could get involved in workplace learning. Her excitement about the summer experience has caused a number of other juniors at Central Washington University to apply for next year's project. This student's college advisor, Dr. Willa Dene Powell, said having workplace learning experiences before starting student teaching is an excellent way to help prepare students for teaching. She also felt such experiences, especially if tailored for one-week, would be beneficial to many college teachers.

3. **Linking school- and work-based learning.** In relation to the third goal, the project provided participating teachers a realistic view of what is occurring in the workplace and has motivated many to use workplace examples in their classes. In addition, participants were expected to develop written applications that could be shared with other teachers. This resulted in the publication of the Workplace Applications Manual, which contains hundreds of applications organized by subject area and SCANS competencies. Each application is also coded by the Washington Commission on Student Learning Goals to facilitate implementation. This manual is being disseminated widely within Washington state and nationwide, and the project director has been requested to make presentations throughout the United States.

4. **Improved academic and vocational learning.** The Workplace Applications Project has contributed to improved links between academic and vocational learning in three ways. First, educator teams that visited workplaces were organized to include both academic and vocational teachers. Some of the teachers reported that a key benefit was getting to know teachers from other disciplines whom they may not have otherwise gotten to know. Second, the project provides academic teachers with hundreds of workplace applications they can integrate into their math or other curricula. Third, organizing employer sites to be visited into career cluster areas of Arts and Communications, Business/Management, Manufacturing/Engineering, Health Occupations, Natural Resources, and Government enabled teachers to start thinking in broader sectors than specific occupations and laid a foundation for academic involvement in each of these broad cluster areas. This should enhance the usefulness of the manual to other schools that are moving toward career clusters.

In summary, the Workplace Applications Project has made a major contribution to the goals of the consortium as well as to Tech Prep and school-to-work initiatives in Washington and other states.

A second promising practice was the planning and conducting of a "Try a Trade, Try a Technology" day held for 300 young women this spring from many high schools in the Consortium. This event was conducted to expose young women to nontraditional employment opportunities. It involved approximately 25 staff from the participating schools, 12 community college students, and 20 people from business, industry, and labor who are on the advisory committee. The young women each had a chance to participate in hands-on experiences such as hard wiring a residential telephone, painting an automobile, and welding a metal object. In addition to the young women, counselors who attended also participated in some of the hands-on experiences.

Each of the young women in the "Try a Trade, Try a Technology" day at Green River Community College participated in one of the following sessions: airline dispatch planning auto body, automotive technician, carpentry, computer integrated manufacturing, engineering technology, forestry technology, machine technology, telecommunications, or welding.

Young women in the "Try a Trade, Try a Technology" day at the Renton Technical College each participated in one of the following sessions: auto parts systems, auto body, Ford Asset, job skills for trade and industry, precision machining, building operating engineer, drafting, electronics engineering tech, telecommunications, or office equipment repair.

Evaluation of this day revealed that it generated a high degree of interest among the participating students as well as in women from industry willing to mentor young women interested in exploring nontraditional occupations. Written evaluations completed by 182 participating young women for the Green River Community College location indicated that 50 percent found the day's experience to be very interesting, 41 percent found it interesting, and 9 percent found it not interesting. Ninety-four percent of the participants at Green River indicated that the event helped them think about their future career choices. Written evaluations completed by 137 participating young women for the Renton Technical College location indicated that 36 percent found the day's experience to be very interesting, 51 percent found it interesting, and 13 percent found it not interesting. Ninety-eight percent of the participants at Renton Technical College indicated that the event helped them think about their future career choices.

A third promising practice is the new Manufacturing Technology Internship that the consortium was selected to develop. The consortium was awarded $70,000 by Heath Tecna and another major manufacturer in the region to develop this internship for high school and community college students. The internship is intended for 20 to 30 students who will work in 10 South King County manufacturing firms for three summers. The goal of the project is to demonstrate that small companies can combine their resources to offer an internship program. Each company will offer the students part of the internship at its own site two to three days per week. All students will come together at one location for the classroom portion of the internship which will be based on Washington State Manufacturing Technology Competencies. Each company will be responsible for a portion of the classroom instruction. Students will be exposed to manufacturing of a wide variety of products and processes as well as materials.

Tech Prep and School-to-Work Transition

The South King County Consortium has been a leader in integrating Tech Prep into school-to-work transition and other educational reform efforts. As a result of the collaboration existing among districts and other groups within the consortium they were successful in applying for and receiving major funds for a local partnership in a School-to-Work grant from the U.S. Department of Education. The proposal abstract summarized the consortium's intentions as follows:

> "One challenge of this grant is to use our Tech Prep and STW infrastructure and experience to enhance, build, and 'roll out' a STW system for all students in our entire region. We will build upon our highly successful models such as Workplace Applications and the Boeing Manufacturing Technology initiative, and an extensive partnership that includes business, labor, educators, and many other stakeholders in our region."

The Governor's Task Force on School-to-Work Transition reviewed the proposal and commented especially on five strengths of the application: "1) broad inclusive partnerships, 2) connects to state education reform and career pathways, 3) school-based learning component enhances teacher-workplace connection and training via workplace applications, 4) connects with and leverages established programs, i.e. Tech-Prep and MTAG to support STW system planning, implementation, expansion, and 5) provides single point of contact and coordination."

Project staff have had a number of discussions with members of the state's School-to-Work Partnership, particularly the Workforce Training and Education Coordinating Board, on such issues as regional structures, funding streams for future sustainability, and ensuring the participation of all students and all grade levels.

In addition to the fit with school-to-work transition, Tech Prep has contributed to other educational reform efforts in Washington such as the Commission on Student Learning, the SLIG Grants, and Career Pathways. A specific example of this contribution comes from the Workplace Applications where teachers are oriented to the essential learning goals of the state and code their application examples by the essential learning codes as well as by the career pathway each example illustrates. This is helping both academic and vocational technical teachers to become more familiar with the essential learning goals and the career pathways.

Impact on Participating Students

The Tech Prep coordinator is getting calls from students and counselors asking for career information. At the secondary level, students are understanding better their career options as well as their options for going to college. Students are becoming more interested in a two-year community college degree. More students are talking about their education plans. There is less negative attitude toward vocational education. Students want the hands-on format and it is helping them learn. It is too soon to tell about an increase in enrollments in the community colleges since 1995-96 is the first full year of the new curriculum for 11th graders.

At the community college level, staff felt that Tech Prep and especially student internships are giving students a better understanding of industry and the hardware being used there. It is still too soon to tell the cumulative effects of students who have had several years of Tech Prep in high school who continue on and complete a related associate degree program at Green River Community College.

Strengths and Concerns

Strengths. The consortium director felt that one of the strengths of the consortium was the Workplace Applications placement of teachers into business and industry to learn more about what is occurring in the workplace and to gather examples of how subject content is being applied in the community. Strengths seen by other educators are the "Try a Trade, Try a Technology" day for young women to help them explore a nontraditional occupation, the Boeing student and teacher internships which have helped students and teachers better understand the competencies needed in manufacturing, the increased collaboration between business, labor and education, increased communications between secondary schools and Green River Community College, the improved articulation agreements, increased networking among schools, and the work to expand the career pathways. A business partner perceived strengths to include the pathways being developed, the improved business-education partnerships, the student internships, and the development of the MTAG manufacturing curriculum. A labor representative perceived strengths to include the move to involve all students not in a university track, the upgrading of the vocational education image, and better collaboration between labor and employers in Tech Prep.

In the MPR Tech Prep Implementation Survey the Consortium director identified the following strengths: development of academic support, collaboration between secondary and postsecondary educators, collaboration of vocational and academic educators, establishing clearly defined Tech Prep guidelines, developing articulation agreements, obtaining support of business/industry and labor, and integrating Tech Prep into larger reform efforts.

Concerns. Among the weaknesses educators perceived in the program were the lack of clarity of how Tech Prep fits with School-to-Work, lack of good assessment data on students, lack of agreement on defining Tech Prep students, the failure to get word out to parents that Tech Prep is open to four-year college-bound students, the need to start before the high school years, the need to better integrate vocational technical applications into academic classes, the need to expand work-based learning opportunities for more teachers and students, and the failure to help some teachers see the need to value applied knowledge.

In the Mathematica Policy Research Tech Prep Implementation Survey the consortium director identified the following obstacles to implementation of Tech Prep: negative attitude toward vocational education and/or Tech Prep, turf battles between secondary and postsecondary educators, and lack of staff, time, and money dedicated to Tech Prep.

Northeast Washington Technical Education Consortium

Community

Spokane, with a population of 185,600 is the largest city in the inland Northwest. Located 18 miles from the Idaho border and 110 miles south of Canada, it is the trade and medical center for a 36-county region covering eastern Washington, north Idaho, western Montana, and parts of Oregon, British Columbia, and Alberta. Spokane County has a population of 392,000 and stretches over 1,758.3 square miles, reaching from west of the downtown area to the Washington-Idaho border.

The unemployment rate in Eastern Washington is lower than the national average. Employment is stable in numerous industries, and new industries are being established in the Post Falls, Idaho-Spokane corridor. Informal surveys of these industries indicate that a technically well-trained workforce is essential.

Consortium Overview

NEWTEC, the Northeast Washington Technical Education Consortium serves six counties which are made up of 58 districts, 65 high schools, Spokane Community College (SCC), Spokane Falls Community College (SFCC), Eastern Washington University and Washington State University (WSU). Consortium members offer 120 different vocational programs, all with a work-based learning component.

NEWTEC project activities employ the Tech Prep coordinator for approximately 20 percent of her time. Her position as School and College Relations/International Programs Officer is a full-time administrative appointment in the district office of the Community Colleges of Spokane. Tech Prep is part of her full-time job description. Community college staff are expected to coordinate any contacts with high schools through her office. In addition, NEWTEC employs four Tech Prep staff to assist the coordinator:

- FOCUS Coordinator at Ferris High School (language arts teacher)
- Spokane Community College instructor who was instrumental in completing articulation agreements for Tech Math 1, 2, 3 and 4 for three of the Manufacturing/Engineering Pathway programs
- A teacher at the skills center who also coordinates the Communication Pathway at SFCC
- A retired high school vocational director (consultant) who facilitates articulation agreements

Ferris High School. The principal of Ferris High School learned of Tech Prep at a conference and understood the potential implications for the school and community. He decided to use Ferris as a pilot site to be replicated to other schools. The school developed an organizational plan called FOCUS for restructuring. The restructuring plan includes the following:

1. Development of five career pathways: business, marketing, and hospitality; fine arts and communication; manufacturing and engineering technology; health and human services; and science and the environment.

2. Guidance committee involving counselors in the restructuring of the guidance program.

3. Highly motivated principal who supports the FOCUS program.

4. Applied academic offerings in Technical Math I and II, Principles of Technology, Applied Communication, ABC, and Applied English. (There is strong support by the academic teachers for applied teaching.)

5. Seventy-five percent of the staff have had "back to industry experience" in the last two years. This includes academic, vocational and support staff.

6. Many presentations on FOCUS have been made to schools, parents, business, and community.

7. Career Center is using educational plan portfolios for students.

8. Administrators, teachers, and counselors have participated in state and national meetings. As one teacher said, "Participation in conferences changes attitudes and promotes buy-in to the program."

9. The FOCUS program views the state's Essential Learnings as a driving force for performance assessment.

10. All freshmen visited SCC and SFCC to learn about career opportunities at the colleges.

Ferris has an enrollment of more than 1,700 students, including 500 freshman this year. Freshmen and sophomores are now part of Tech Prep. It will take another two years for seniors to graduate from the Tech Prep/FOCUS.

When NEWTEC received its Tech Prep funding the coordinator saw the need to have an individual within the high school who would promote and coordinate Pathways activities. Since the coordinator is paid only 20 percent of her time to initiate activities a hired school staff person was employed as the FOCUS coordinator. Hired staff carry out the mission on site during they have daily contact with school staff and students. The daily presence lends itself to the success of the program because the person is a well-known part of the school staff and immediately accepted as an insider.

Changes and Accomplishments in the Last Year

Many changes have taken place to integrate Tech Prep with the restructuring efforts at Ferris High School as well as other high schools:

1. Articulation agreements for up to five college credits in Applied Math I and II at Ferris will transfer into the MET, CET and ELMT programs at SCC. As soon as five additional high schools offer Applied Math II, this will be an automatic articulation agreement. They all were involved in identifying the competencies.

2. An articulation agreement for a five credit Applied Physics course in MET at SCC is in process for the Applied Principles of Technology at Ferris.

3. Rogers High School is in the process of restructuring its education system and is using parts of the Ferris model. Under consideration is a ninth grade high school orientation class to assist all students in developing and refining necessary competencies to have a positive academic and personal high school experience.

4. The consortium has supported faculty from Rogers High School, Ferris High School, and Central Valley district to participate in applied academic training. Community college faculty have attended applied math and applied communication training.

5. Tech Prep has been the key in the collaboration effort for the Communications Pathway at SFCC. The articulation agreement in photography will speed up the process for additional agreement such as graphic arts. Approximately 10 high schools have been involved in this process.

6. The Learning Resource Center at SFCC has received a grant from U.S. West. The focus of the project is on Distance Learning. Tech Prep will be included in the project.

7. Eight high school teachers from Creston, Cusic, Ferris, West Valley, Rogers, Mead University, and the Skills Center are working with postsecondary liberal arts and technical faculty to develop competency-based modules in math, physics, and graphic design. Each school received a computer through this project.

8. Colleges and high school vocational education programs have changed their name to professional-technical programs to provide a new image.

9. A career fair is held each spring at SCC and SFCC for high schools, business and college students to visit with employers on their expectations in the workplace and employment opportunities.

10. PATHWAYS, a marketing project used by districts and colleges, is raising the level of awareness for Professional/Technical Education at middle school, high school and college levels. It is funded by district K-12, colleges and Spokane Teachers Credit Union. Pathways incorporates multiple components of various education reform

initiatives including Goals 2000, the state learning goals, and Tech Prep. A PATHWAYS newsletter is published monthly and distributed to high school, middle, business, colleges, advisory committees. A regular column focuses on NEWTEC Tech Prep activities.

11. Consortium funds were used to develop a PATHWAYS Professional-Technical Education 1995 Directory. The directory identifies professional-technical education secondary information by program, district, high school, teacher and phone. In addition, the Community Colleges of Spokane Professional-Technical staff are identified by program, instructor, campus and phone.

12. The Tech Prep coordinator developed an annual workshop called "Connections." High school teachers, counselors, career center specialists, and principals spend an entire day visiting the programs at the colleges. Consortium funds are used to support substitutes. This workshop began fall 1994 with 100 participating from District 81. Another workshop was held winter quarter 1995 with 100 participants from Mead School District and Valley School District. Approximately 52 rural schools were targeted on November 2, 1995. This is an exemplary model for marketing programs at the Community Colleges of Spokane. One teacher commented, "I had no idea of the programs offered at SCC and SFCC."

13. The Tech Prep coordinator speaks to many student and parent groups about the programs of study made available through the Community Colleges of Spokane. She has developed a booklet which contains information on job opportunities, higher education, financial aid, program offerings, degree and certificate offerings, college life, etc., in an effort to provide information to assist students and parent with educational decisions.

14. Articulation agreements in Auto Tech and Machine Shop Tech and Fluid Power at SCC have been completed and signed.

15. All junior and senior students in Pathways are eligible for the Pacesetter awards. This award is designed to recognize any and all Professional-Technical Education students that meet the criteria established by the Pacesetter committee. Qualified students will receive recognition, as well as the opportunity to meet business owners and to be exposed to job opportunities.

Though the project focus was to develop a Tech Prep model with Ferris High school, cooperation and collaboration among high schools to promote Tech Prep activities in additional schools is evident. For example, the Ferris model is being informally disseminated to Rogers High School with faculty of the two schools meeting monthly. North Central High School faculty are also motivated to begin adopting similar Tech Prep components.

There is also strong cooperation between Ferris High School and the two Spokane Community Colleges and Spokane Falls Community College in developing articulation agreements.

Promising Practices

- All articulation agreements are now in the same format to avoid confusion and formalize the process so that it is easier to develop new agreements. This helps with increased coordination of articulation agreements between and among schools.

- It has been increasingly difficult to get faculty and students from university departments of education actively involved and knowledgeable about Tech Prep initiatives and practices. One of the teachers from Ferris High School who is part of the restructuring planning team also sits on the Professional Education Advisory Board of Gonzaga University. In this capacity he is able to make presentations about Tech Prep and restructuring to faculty and students in the teacher-education program at the university. Department heads from Gonzaga University have expressed an interest in bringing faculty and students to the Ferris High School campus. This collaboration has major implications for teacher education and holds potential for developing ongoing communication with higher education about practices and strategies associated with new models of teaching and learning.

- Fluid Power, a company in Spokane, is paying for three teachers (math/science faculty) to spend one week at a seminar in Detroit, Michigan. The seminar will bring the teachers up to date on state-of-the art equipment used in Fluid Power instruction. Students in the class will have the most current information through this business-education partnership.

- Spokane is fortunate to have an active and growing Manufacturing Technology Advisory Group (MTAG). MTAG has been actively involved with Tech Prep in Spokane. Members of the group sit on the consortium advisory committee to lend their support and direction to ongoing activities. As MTAG involvement grows for Tech Prep the benefits will demonstrate how business and education can provide varied opportunities for teachers and students to learn about the workplace needs of the consortium locale. This input will give the consortium current and local labor market information that can be applied directly to the classroom through the site coordinators.

- Using applied teaching/learning approaches developed from the Tech Prep model the World Language Department has developed an applied learning approach in which each semester classes from Ferris High School visit the Introduction to World Languages classes at the feeder middle schools where they mentor the students and give them an idea of what life is like in high school languages classes. Ferris students also tutor elementary students in Spanish. The program was established by parents at several of the feeder elementary school. Students are paid for their time as part of a work-based learning opportunity.

- Work-based learning opportunties for students wishing to develop their interests in teaching provide hands-on experiences in the classroom The Teacher Academy provides students with classroom observations and actual teaching experiences.

Tech Prep and School-to-Work Transition

Because Spokane only recently received a School-to-Work grant (in March) there has been no evidence to date of collaboration or integration with the Tech Prep project. Consortium members reported that collaboration and integration will take place as the school-to-work grant unfolds since so many areas overlap with Tech Prep.

Impact on Participating Students

The impact of Tech Prep on students is not yet measurable because the program is still new. However, students do participate in work-based learning and career exploration as part of FOCUS and have increased awareness of career choices.

Because 80 percent of the teachers experience visits to job sites and participate in job shadowing they are better able to communicate industry needs and practices to students directly in the classroom. Application-based learning draws parallels with the real world Students are then more aware of the kinds of workplace applications they are learning in the classroom

The Audio Production Laboratory made students aware of the kinds of academic background needed in this field. It also raised expectations of students since they were better informed about why they were learning specific topics.

Strengths and Concerns

Strengths.

- Strong marketing strategies
- Support from the Spokane Teacher's Credit Union which provided financial support for a glossy brochure on career pathways for the Spokane School District
- MTAG participation
- Local business involvement
- A strong principal at Ferris High School who provides leadership and support for the program
- Collaboration between principal, faculty, and counselors at Ferris High School
- Strong administrative support within the school, so that barriers to implementation are reduced

Concerns.

- Tech Prep is currently at only at one high school and is thus reaching only a small population

- There is a growing need for a coordinator at the middle school at least on a part-time basis. The coordinator must be a teacher and not an administrator in order to effectively plan the development of new courses and curricula. This concept is strongly supported by the principal and vice-principal of Ferris High School who are working to develop district support for integrated leaning

STUDENT SURVEY RESULTS

While the first section reported the implementation status of Tech Prep for all 22 Tech Prep consortia in Washington and Section II described in much greater detail what was actually occurring in seven specific Tech Prep consortia, Section III provides description about students in four high schools in Washington selected from among the seven case study sites

Student Survey Analysis

This section is based on data provided by four schools representing urban, suburban, and rural communities. The four high schools are Ingraham (in Seattle), Issaquah, Hoquiam, and Wapato. Table 19 shows the total number of students surveyed in each school. All schools used students in ninth through 12th grade except Ingraham which elected to use only 12th grade students. Table 20 shows the number and percentage of students by grade level across the four schools. Students were fairly evenly divided by gender with 51 percent being female

Table 19
High Schools Participating in Student Survey

	Number of Students	Percentage of Total
Ingraham*	110	5
Issaquah	1078	51
Hoquiam	478	23
Wapato	447	21
Total:	2113	

*Only seniors were surveyed at Ingraham High School

Table 20
Distribution of Surveyed Students by Grade Level

	Number of Students	Percentage of Total
9th	705	33
10th	593	28
11th	286	14
12th	449	21
Not recorded	80	4

The student survey was developed by NWREL evaluation staff in cooperation with representatives from the Washington Tech Prep Consortium Directors Association, the Office of Superintendent of Public Instruction, the State Board for Community and Technical Colleges, and the Workforce Training and Education Coordinating Board Four drafts were developed and refined over a three-month period with input from representatives of the above agencies. The intent was to select appropriate questions that could be answered by students in 15 minutes or less that covered some important demographic information as well as student experience related to career planning, school-based learning, work-based learning, connecting activities, Tech Prep, and future plans.

A sample of students from the Clark County Vocational Skills Center was used to pilot test the instrument. These students were debriefed after completing the draft survey to identify any misleading questions or suggest rewording of questions. Based on feedback from them and their instructor final revisions were made to the instrument.

Findings

Demographics

Tables 21 and 22 show the responses to demographic questions describing the students in the survey. Table 21 indicates that about 30 percent were students of color with 14 percent being of Spanish/Hispanic origin. Table 22 indicates that the average grade point average of those students reporting it and excluding missing data was 3.22 on a four-point scale. Students averaged 10 days absent from school. Their mothers completed 13 years of formal education on the average. This question was used since prior research indicates it is an excellent predictor of student success. Less than 20 percent of the students reported having taken applied mathematics or applied science which are sometimes used as an academic foundation for Tech Prep.

Table 21
Ethnicity of Surveyed Students

	Number	Percent
African American	27	1
Asian/Pacific Islander	135	7
Indian/Aleut/Eskimo	112	5
Spanish/Hispanic	301	14
White	1449	69
Multiple Responses	66	3
Total	2090	

*Number of missing responses: 321

Table 22
Responses to Demographic Questions

		Grade Level				
		9	10	11	12	Total
1	Current grade point average (GPA) (Mean)	3.25	3.15	3.24	3.17	3.22
2	Days absent so far this school year (Mean)	9	9	11	12	10
3	Years of schooling your mother completed (Mean)	14	14	13	13	13
4	Percent having taken an applied mathematics class (one where you learn to apply math to various occupations)	13	12	21	33	18
5	Percent having taken an applied science class (like Principals of Technology) where you apply science to various occupations	9	12	15	31	16

Career Development

Several questions on the survey related to students career development experiences Table 23 indicates that 80 percent of all students had taken a career interest survey in high school and 71 percent had completed an Individual Career Plan; however, only 61 percent reported having talked to a school staff member this year about career ideas

Table 23
Responses to Career Development Questions

		Percentage Stating Yes by Grade Level				
		9	10	11	12	Total
1	Have you ever completed an Individual Career Plan (where you identify careers of interest and high school courses you will take related to them)	67	76	72	68	71
2	Have you ever taken a career interest survey (either paper or computer form such as WOIS) to help you understand what careers you might be interested in?	75	79	87	88	81
3	Have you talked to school staff (counselors, teacher, principal) about your career ideas this school year?	49	51	87	77	61

Tech Prep

Across the country there is considerable disagreement about how to define a Tech Prep student. Rather than assume a single definition that would apply in all high the survey asked whether students had even heard of the term "Tech Prep." The response gives an indication of the marketing effects of Tech Prep on students. Despite local and statewide efforts to market Tech Prep only 57 percent of the students reported having heard of the term As shown in Table 24, when a definition of Tech Prep was provided, 15 percent of the students (254) indicated they were Tech Prep students. Of these students only 62 percent said they had heard of the term "Tech Prep." Although 39 percent of the students were aware of articulated credits only 14 percent planned to use such credits Although Running Start is available to students in Washington only 4 percent participated

Table 24
Responses to Questions Regarding Tech Prep or Running Start

		Percentage Stating Yes by Grade Level				
		9	10	11	12	Total
1	Have you ever heard of the term "Tech Prep"?	64	62	39	52	57
2	Tech Prep students are those enrolled in a sequence/program of competency-based studies articulated with a community or technical college Do you consider yourself a Tech Prep student?	13	14	14	18	15
3	Tech Prep students can earn high school course credits that can be transferred when they enroll in a community/technical college. Were you aware of the process for transferring "articulated" credits?	41	44	37	36	40
	If yes, do you plan to transfer credits to a community/technical college?	32	22	20	24	26
4	Have you participated in Running Start that allows you to enroll in a college class and earn college credit while in high school?	3	5	3	5	4

Career Pathways

An important part of school-to-work transition, and to a lesser extent Tech Prep, is a career pathways structure in which all students are expected to select one of approximately six clusters of occupations to explore and take coursework related to it Although each of the four schools in our study had career pathways available, only 60 percent of the students knew about pathways and only 47 percent participated in a pathway The most frequent pathways, as indicated in Table 25 were business and marketing, arts and communication, and health Interestingly 11 percent indicated they were in more than one pathway

Table 25
Responses to Questions Regarding Career Pathways

		Percentage Stating Yes by Grade Level				
		9	10	11	12	Total
1.	Do you know what "career pathways" are?	51	64	68	64	60
2.	Are you in a career pathway?	39	46	61	51	47
	If yes, which one?					
	• Arts and Communication (graphics, radio and television, journalism, etc.)	19	20	17	11	17
	• Business and Marketing (accounting, marketing, etc.)	22	18	20	18	19
	• Engineering and Technology (electronics, drafting, automotive technology, etc.)	18	21	10	18	18
	• Health Careers (anatomy, sports medicine, etc.)	11	11	17	16	13
	• Human Services (child care, food services, etc.)	9	7	16	16	11
	• Science and Environment (forestry, agriculture, etc.)	5	4	6	5	5
	• Others	6	7	4	7	6
	• More than one of the above	10	13	9	9	11

Work-Based Learning

For both school-to-work transition and Tech Prep it is important that students have opportunities to go into the community to learn about careers. As shown in Table 26, 57 percent of the students reported that their schools had arranged for them to go into the workplace to learn about one or more careers. As expected, a lesser number (17 percent) had participated in an internship or cooperative education program.

Table 26
Responses to Questions Regarding Work-Based Learning

		Percentage Stating Yes by Grade Level				
		9	10	11	12	Total
1.	Has your high school ever arranged for you to go into a workplace to learn about one or more careers (through field trips or job shadowing, for example)?	65	60	52	43	57
2.	Have you ever participated in a career internship or cooperative education program?	14	14	27	21	17

Connecting Activities

The School-to-Work legislation requires not only work-based learning and school-based learning but also what is referred to as connecting activities that integrate the two. As shown in Table 27, more than 60 percent of the students reported that their teachers showed them how what they were learning in one class related to a future career/occupation and that most of their teachers showed how what they learned in one class can relate to other classes. Sixty-eight percent reported that they learned some of the basic occupational and related academic skills required to enter an occupation of interest.

Table 27
Responses to Questions Regarding Connecting Activities

	Percentage Stating Yes by Grade Level				
	9	10	11	12	Total
1. Have most of your teachers shown you how what you are learning in class can relate to a future career/occupation?	70	53	60	62	62
2. Have most of your teachers shown you how what you learn in one class can relate to other classes?	72	59	66	70	67
3. Have you learned yet some of the basic occupational and related academic skills required to enter an occupation of interest?	65	64	69	75	68

Future Plans

The student survey attempted to determine not only what students' high school experiences had been but also what their plans were for the future. Table 28 shows the response to questions dealing with students' future plans. Consistent with prior students, 74 percent of the students planned to attend a four-year college within three years of graduating from high school and 42 percent planned to attend a community or technical college within two years of graduation. There were 16 percent who planned to enroll in a vocational/technical program at the community college. Many of the rest were probably planning to enter a transfer program at the community college.

Table 28
Responses to Questions Regarding Future Plans

	Percentage Stating Yes by Grade Level				
	9	10	11	12	Total
1. Do you plan to attend a community or technical college within two years after graduating from high school?	38	38	46	56	43
2. Do you plan to enroll in a vocational/ technical program at the community/ technical college (such as manufacturing technology, accounting, health, etc.)?	17	17	16	20	18
3. Do you plan to attend a 4-year college within three years of graduating from high school?	81	80	73	70	77
4. What is the highest level of education you plan to complete?					
• Less than high school	2	2	1	1	1
• High school graduate	4	6	5	8	6
• Vocational, trade, or business school certificate/diploma	3	2	5	6	4
• Community/technical college graduate	12	13	18	16	14
• 4-year college graduate	53	54	44	41	50
• Post-graduate studies	26	24	27	28	26

Special Analysis

In addition to the above descriptive information we have also analyzed the data to determine the extent to which students who judged themselves to be Tech Prep students are significantly different from those saying they are not Tech Prep students. There were 254 Tech Prep students and 1432 non-Tech Prep students. After excluding missing data we ran a Crosstabs program in the SPSS software package to determine Chi Square values for categorical variables such as yes/no and an analysis of variance (ANOVA) to determine F-test values for continuous variables such as actual number of days absent during the school year. Appendix A contains the survey questions, percentage of Tech Prep and non-Tech Prep students stating yes to each question, the Chi-Square statistic, and the significance level. In cases where a continuous variable is used, such as GPA, the ANOVA and F-test result are show.

In general the non-Tech Prep students had a higher GPA, had a mother with more years of schooling, and were more likely to go to a four-year college than were Tech Prep students. There was no significant difference between the two groups in school attendance. Tech Prep students, in comparison to non-Tech Prep students from the same schools were significantly more likely to have done the following:

- Completed an Individual Career Plan
- Taken a career interest survey
- Taken an applied mathematics class
- Taken an applied science class
- Talked to school staff about career ideas
- Planed to attend a community or technical college
- Plan to enroll in a postsecondary vocational/technical program area
- Participated in a workplace learning experience such as job shadowing or internship
- Had teachers who showed how classroom learning relates to future careers
- Had teachers who showed how what was learned in one class relates to other classes
- Participated in Running Start
- Heard of the term "Tech Prep"
- Been aware of articulated credits
- Known what occupation they plan to enter after completing their education
- Learned some of the basic occupational and related academic skills required to enter an occupation of interest
- Known what a career pathway is and to have participated in one

APPENDIX A

Comparative Responses of Tech Prep and Non-Tech Prep Students

1. Have you ever completed an Individual Career Plan (where you identify careers of interest and high school courses you will take related to them)?

Percentage Stating Yes

Tech Prep	Non-Tech Prep	Chi-Square	Significance Level
84	68	32	.001

2. Have you ever taken a career interest survey (either paper or computer form such as WOIS) to help you understand what careers you might be interested in?

Percentage Stating Yes

Tech Prep	Non-Tech Prep	Chi-Square	Significance Level
87	79	10	.002

3. Have you ever taken an applied mathematics class (one where you learn to apply math to various occcupations)?

Percentage Stating Yes

Tech Prep	Non-Tech Prep	Chi-Square	Significance Level
25	17	11	.001

4. Have you ever taken an applied science class (like Principles of Technology) where you apply science to various occupations?

Percentage Stating Yes

Tech Prep	Non-Tech Prep	Chi-Square	Significance Level
24	14	20	.001

5. Have you talked to school staff (counselor, teacher, principal) about your career ideas this school year?

Percentage Stating Yes

Tech Prep	Non-Tech Prep	Chi-Square	Significance Level
73	60	19	.001

6. Do you plan to attend a community or technical college within two years after graduating from high school?

Percentage Stating Yes

Tech Prep	Non-Tech Prep	Chi-Square	Significance Level
64	39	64	.001

7. Do you plan to enroll in a vocational/technical program at the community/technical college (such as manufacturing technology, accounting, health, etc.)?

Percentage Stating Yes

Tech Prep	Non-Tech Prep	Chi-Square	Significance Level
34	14	63	.001

8. Do you plan to attend a 4-year college within three years after graduating from high school?

Percentage Stating Yes

Tech Prep	Non-Tech Prep	Chi-Square	Significance Level
67	79	25	.001

9. Has your high school ever arranged for you to go into a workplace to learn about one or more careers (through field trips or job shadowing, for example)?

Percentage Stating Yes

Tech Prep	Non-Tech Prep	Chi-Square	Significance Level
66	56	12	.001

10. Have you ever participated in a career internship or cooperative education program?

Percentage Stating Yes

Tech Prep	Non-Tech Prep	Chi-Square	Significance Level
26	16	18	.001

11. Have most of your teachers shown you how what you are learning in class can relate to a future career/occupation?

Percentage Stating Yes

Tech Prep	Non-Tech Prep	Chi-Square	Significance Level
72	60	15	.001

12. Have most of your teachers shown you how what you learn in one class can relate to other classes?

Percentage Stating Yes

Tech Prep	Non-Tech Prep	Chi-Square	Significance Level
76	65	14	.001

13. Have you participated in Running Start that allows you to enroll in a college class and earn college credit while in high school?

Percentage Stating Yes

Tech Prep	Non-Tech Prep	Chi-Square	Significance Level
8	3	18	.001

14. Have you ever heard of the term "Tech Prep"?

Percentage Stating Yes

Tech Prep	Non-Tech Prep	Chi-Square	Significance Level
62	57	4	.054

15. Tech Prep students can earn high school course credits that can be transferred when they enroll in a community/technical college. Were you aware of the process for transferring "articulated" credits?

Percentage Stating Yes

Tech Prep	Non-Tech Prep	Chi-Square	Significance Level
58	37	50	.001

16. If yes, do you plan to transfer credits to a community/technical college?

17. What is your current grade point average (mean GPA)?

Tech Prep	Non-Tech Prep	ANOVA F	Significance Level
3.14	3.23	4.65	.031

18. About how many days were you absent so far this school year? (mean)

Tech Prep	Non-Tech Prep	ANOVA F	Significance Level
10.0 days	9.9 days	.04	.840

19. Do you know what occupation you plan to enter after completing your education?

Percentage Stating Yes

Tech Prep	Non-Tech Prep	Chi-Square	Significance Level
67	56	19	.001

20. Have you learned yet some of the basic occupational and related academic skills required to enter that occupation?

Percentage Stating Yes

Tech Prep	Non-Tech Prep	Chi-Square	Significance Level
78	66	23	.001

22. Number of years of schooling your mother completed? (mean)

Tech Prep	Non-Tech Prep	ANOVA F	Significance Level
12.7 years	13.5 years	7.41	.007

23. Do you know what "career pathways" are?

Percentage Stating Yes

Tech Prep	Non-Tech Prep	Chi-Square	Significance Level
73	57	25	.001

24. Are you in a career pathway?

Percentage Stating Yes

Tech Prep	Non-Tech Prep	Chi-Square	Significance Level
68	43	61	.001